# PHILIPS 32PW8506/12

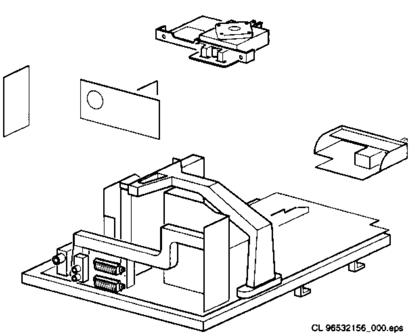
MODEL

SERVICE MANUAL

**Colour television** **Chassis**

# EM2E
## AA

Service
Service
**Service**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# Service Manual

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**PHILIPS**

# 1. Technical specifications, connection facilities and chassis overview

## 1.1 Technical specifications

### 1.1.1 Reception

| | | |
|---|---|---|
| Tuning system | : | PLL |
| Reception | : | |
| TV systems off air | : | PAL B/G/I, SECAM B/G/L/L' for Western Europe |
| | : | PAL B/G, SECAM B/G/D/K, NTSC M for Eastern Europe |
| Sound systems | : | FM |
| | : | AM |
| | : | NICAM B/G/D/K/I |
| A/V connections | : | PAL B/G/D/K/I |
| | : | SECAM B/G/D/K/L/L' |
| | : | NTSC video playback |
| Channel selections | : | 100 channels: VHF, UHF, S-Channels, Hyperband |
| Frequency range | : | 44.25 - 855.25 MHz |
| Aerial input | : | Coaxial 75Ω |
| VCR preselections | : | 0 and 90 - 99 |

### 1.1.2 Miscellaneous

| | | |
|---|---|---|
| Mains voltage | : | 220V - 240V (± 10 %);<br>50 - 60Hz (± 5 %) |
| Ambient temperature | : | +5 to +45 deg. Celcius |
| Standby Power Consumption | : | < 1W |

## 1.2 Connection facilities

### 1.2.1 Side I/O connections

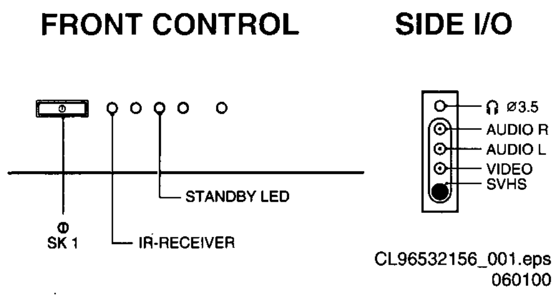

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Figure 1-1

*Audio / video*

| | | | |
|---|---|---|---|
| - | - Video (CVBS) | 1$V_{PP}$ / 75Ω | →○ ◎ |
| - | - Audio | L (0.5$V_{RMS}$ / 10kΩ) | →○ ◎ |
| - | - Audio | R (0.5$V_{RMS}$ / 10kΩ) | →○ ◎ |
| - | - Headphone | (32 - 2000Ω / 10mW) | 🎧 |

*SVHS*

| | | |
|---|---|---|
| 1 - | GND | ⏚ |
| 2 - | GND | ⏚ |
| 3 - Y | (1$V_{PP}$ / 75Ω) | →○ |
| 4 - C | (0.3$V_{PP}$ / 75Ω) | →○ |

### 1.2.2 Rear connections

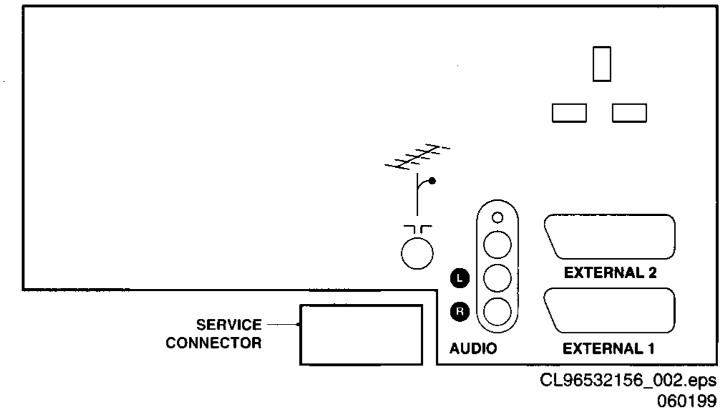

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Figure 1-2

*Audio*

| | | | |
|---|---|---|---|
| - | - Audio | L (0.5$V_{RMS}$ / 10kΩ) | →○ ◎ |
| - | - Audio | R (0.5$V_{RMS}$ / 10kΩ) | →○ ◎ |

*External 1 (in/out): RGB+CVBS*

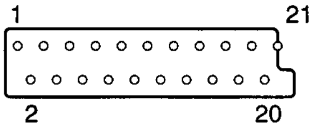

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Figure 1-3

| | | | |
|---|---|---|---|
| 1 | - Audio | R (0.5$V_{RMS}$ / 1kΩ) | ○→ |
| 2 | - Audio | R (0.5$V_{RMS}$ / 10kΩ) | →○ |
| 3 | - Audio | L (0.5$V_{RMS}$ / 1kΩ) | ○→ |
| 4 | - Audio | GND | ⏚ |
| 5 | - Blue | GND | ⏚ |
| 6 | - Audio | L (0.5$V_{RMS}$ / 10kΩ) | →○ |
| 7 | - Blue | (0.7$V_{PP}$ / 75Ω) | →○ |
| 8 | - CVBS-status | 0 - 1.3V: INT, 4.5 - 7V: EXT 16:9, 9.5 - 12V: EXT 4:3 | |
| 9 | - Green | GND | ⏚ |
| 10- | | | |
| 11- | Green | (0.7$V_{PP}$ / 75Ω) | →○ |
| 12- | | | |
| 13- | Red | GND | ⏚ |
| 14- | RGB-status | GND | ⏚ |
| 15- | Red | (0.7$V_{PP}$ / 75Ω) | →○ |
| 16- | RGB-status | 0 - 0.4V: INT 1 - 3V: EXT / 75Ω | |
| 17- | CVBS | GND | ⏚ |
| 18- | CVBS | GND | ⏚ |
| 19- | CVBS | (1$V_{PP}$ / 75Ω) | ○→ |
| 20- | CVBS | (1$V_{PP}$ / 75Ω) | →○ |
| 21- | Earth | GND | ⏚ |

***External 2 (in/out): SVHS+CVBS (intended for VCR)***

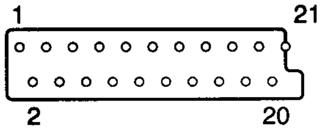

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Figure 1-4

| | | |
|---|---|---|
| 1 - Audio | R (0.5$V_{RMS}$ / 1kΩ) | ○→ |
| 2 - Audio | R (0.5$V_{RMS}$ / 10kΩ) | →○ |
| 3 - Audio | L (0.5$V_{RMS}$ / 1kΩ) | ○→ |
| 4 - Audio | GND | ⏚ |
| 5 - | GND | ⏚ |
| 6 - Audio | L (0.5$V_{RMS}$ / 10kΩ) | →○ |
| 7 - | | |
| 8 - CVBS-status | 0 - 1.3V: INT, 4.5 - 7V: EXT 16:9, 9.5 - 12V: EXT 4:3 | |
| 9 - | GND | ⏚ |
| 10- | Easy link | |
| 11- | | |
| 12- | | |
| 13- Red | GND | ⏚ |
| 14- RGB-status | GND | ⏚ |
| 15- C | (0.7$V_{PP}$ / 75Ω) | →○ |
| 16- | | |
| 17- CVBS | GND | ⏚ |
| 18- CVBS | GND | ⏚ |
| 19- CVBS | (1$V_{PP}$ / 75Ω) | ○→ |
| 20- Y/CVBS | (1$V_{PP}$ / 75Ω) | →○ |
| 21- Earth | GND | ⏚ |

## 1.3 Chassis overview

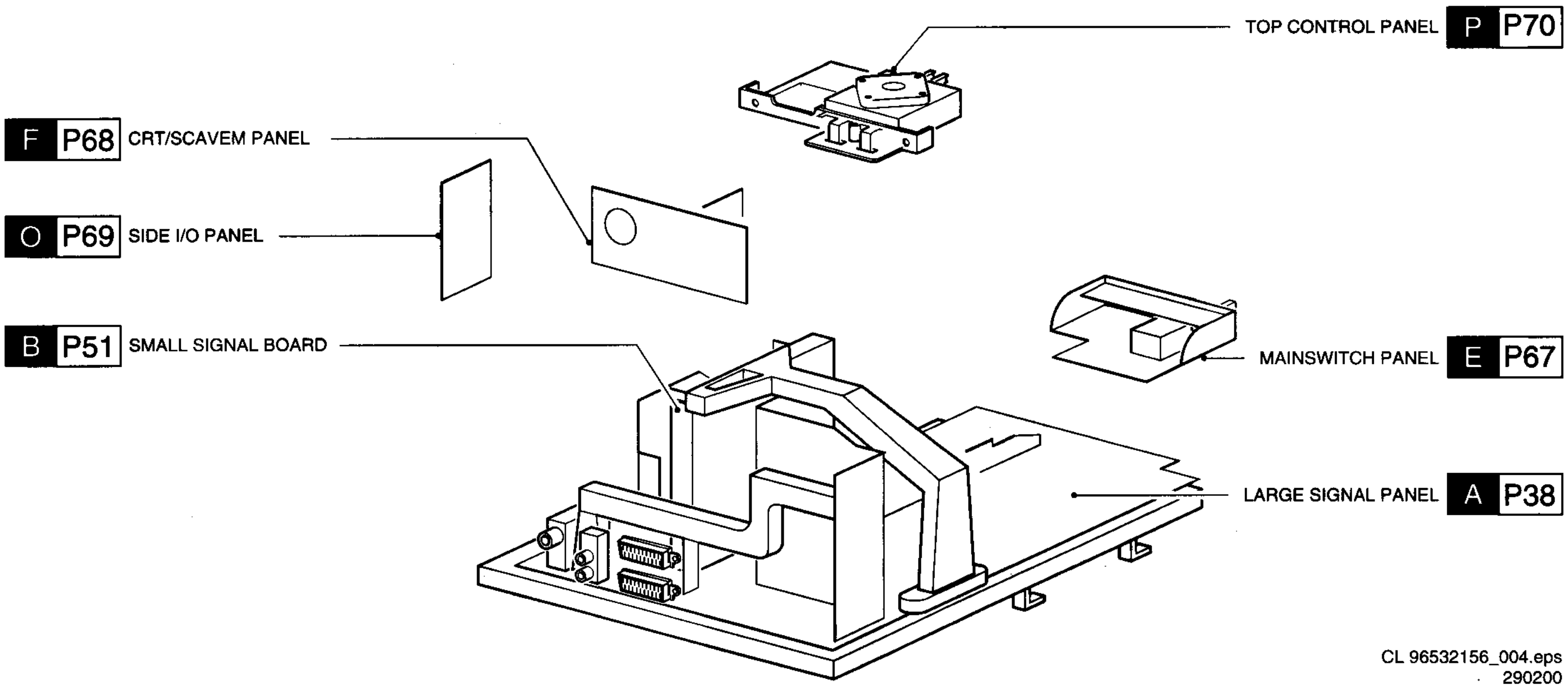
TOP CONTROL PANEL
P P70
F P68
CRT/SCAVEM PANEL
O P69
SIDE I/O PANEL
B P51
SMALL SIGNAL BOARD
MAINSWITCH PANEL
E P67
LARGE SIGNAL PANEL
A P38

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Figure 1-5

# 2. Safety & Maintenance instructions, Warnings and Notes

## 2.1 Safety instructions for repairs

Safety regulations require that during a repair:

- Due to the EM2E concept, a very large part of this chassis (incl. Hor. & Vert. deflection) is 'hot'. Therefore the set must be connected to the mains via an isolating transformer.
- Safety components, indicated by the symbol ⚠, should be replaced by components identical to the original ones.
- When replacing the CRT, safety goggles must be worn.

Safety regulations require that after a repair, the set must be returned in its original condition. In particular attention should be paid to the following points:

- General repair instruction: as a strict precaution, we advise you to resolder the solder joints, through which the horizontal deflection current is flowing, in particular:
  - All pins of the line output transformer (LOT);
  - Fly-back capacitor(s);
  - S-correction capacitor(s);
  - Line output transistor;
  - Pins of the connector with wires to the deflection coil;
  - Other components through which the deflection current flows.

Note: This resoldering is advised to prevent bad connections due to metal fatigue in solder joints and is therefore only necessary for television sets older than 2 years.

- The wire trees and EHT cable should be routed correctly and fixed with the mounted cable clamps.
- The insulation of the mains lead should be checked for external damage.
- The mains lead strain relief should be checked for its function in order to avoid touching the CRT, hot components or heat sinks.
- The electrical DC resistance between the mains plug and the secondary side should be checked (only for sets which have a mains isolated power supply). This check can be done as follows:
  - Unplug the mains cord and connect a wire between the two pins of the mains plug;
  - Set the mains switch to the 'ON' position (keep the mains cord unplugged!);
  - Measure the resistance value between the pins of the mains plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 MΩ and 12 MΩ.
  - Switch off the TV and remove the wire between the two pins of the mains plug.
- The cabinet should be checked for defects to avoid touching of any inner parts by the customer.

## 2.2 Maintenance instructions

It is recommended to have a maintenance inspection carried out by a qualified service employee. The interval depends on the usage conditions:

- When the set is used under normal circumstances, for example in a living room, the recommended interval is 3 to 5 years.
- When the set is used in circumstances with higher dust, grease or moisture levels, for example in a kitchen, the recommended interval is 1 year.
- The maintenance inspection contains the following actions:
  - Execute the above-mentioned 'general repair instruction'.
  - Clean the power supply and deflection circuitry on the chassis.
  - Clean the picture tube panel and the neck of the picture tube.

## 2.3 Warnings

- In order to prevent damage to IC's and transistors, all high-voltage flashovers must be avoided. In order to prevent damage to the picture tube, the method shown in Fig. 2-1 should be used to discharge the picture tube. Use a high-voltage probe and a multimeter (position VDC). Discharge until the meter reading is 0 V (after approx. 30 s).
- ⚠ All IC's and many other semiconductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically. When repairing, make sure that you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential.
- Together with the deflection unit and any multipole unit, the used flat square picture tubes form an integrated unit. The deflection and the multipole units are set optimally at the factory. Adjustment of this unit during repair is therefore not recommended.
- Be careful during measurements in the high-voltage section and on the picture tube.
- Never replace modules or other components while the unit is switched ON.
- When making settings, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.
- Wear safety goggles during replacement of the picture tube.

## 2.4 Notes

- The direct voltages and oscillograms should be measured with regard to the tuner earth (⏚) or hot earth (⏚).
- The direct voltages and oscillograms shown in the diagrams are indicative and should be measured in the Service Default Mode (see chapter 5) with a colour bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz.
- Where necessary, the oscillograms and direct voltages are measured with (⊤) and without (⊤̸) aerial signal. Voltages in the power supply section are measured both for normal operation (Ⓘ) and in Standby (⏻). These values are indicated by means of the appropriate symbols.
- The picture tube PWB has printed spark gaps. Each spark gap is connected between an electrode of the picture tube and the Aquadag coating.
- The semiconductors indicated in the circuit diagram and in the parts lists are completely interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.
- Manufactured under license from Dolby Laboratories Licensing Corporation. DOLBY, the double D symbol and PRO LOGIC are trademarks of Dolby Laboratories Licensing Corporation.

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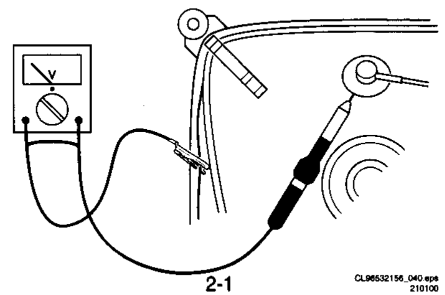
PRO • LOGIC



2-1

# 3. Directions for use

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### Installation

Your remote control **2**
Preparation **3**
Installation **4**
Store TV channels **4**
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  Automatic installation **5**
  Manual installation **5**
Give name **6**
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Select favourite TV channels **6**
Install TV setup **7**

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**Tips 25**
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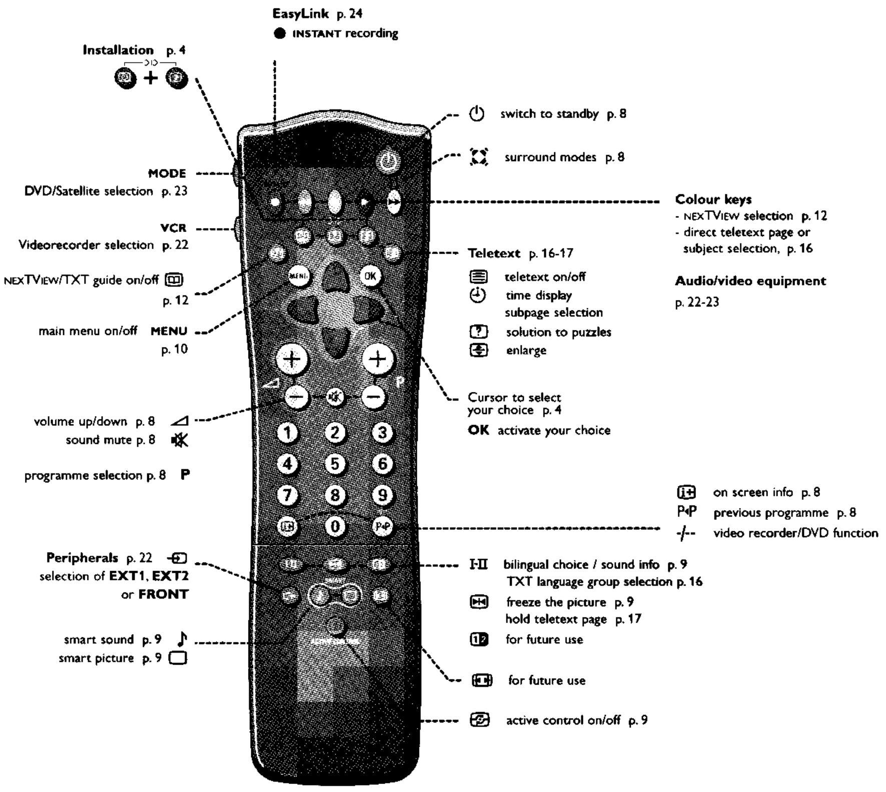
*EasyLink features are based on the "one touch operation" approach. This means that a sequence of actions are executed at the same time in both the television and the video cassette recorder,* ***provided both are fitted with the EasyLink function*** *and connected with the eurocable supplied with your video recorder.*

English

## Preparation

### Your remote control


**EasyLink** p. 24
● INSTANT recording
**Installation** p. 4
**MODE**
DVD/Satellite selection p. 23
**VCR**
Videorecorder selection p. 22
NEXTVIEW/TXT guide on/off
p. 12
main menu on/off **MENU**
p. 10
volume up/down p. 8
sound mute p. 8
programme selection p. 8 **P**
**Peripherals** p. 22
selection of **EXT1**, **EXT2**
or **FRONT**
smart sound p. 9
smart picture p. 9
switch to standby p. 8
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**Colour keys**
- NEXTVIEW selection p. 12
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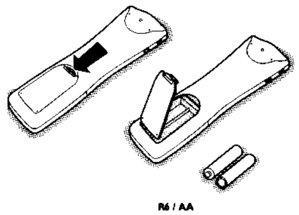
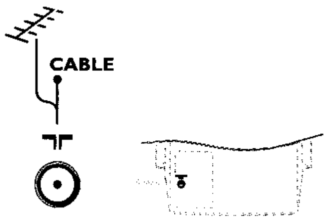
teletext on/off
time display
subpage selection
solution to puzzles
enlarge
Cursor to select your choice p. 4
**OK** activate your choice
on screen info p. 8
P◁P previous programme p. 8
-/-- video recorder/DVD function
I-II bilingual choice / sound info p. 9
TXT language group selection p. 16
freeze the picture p. 9
hold teletext page p. 17
for future use
for future use
active control on/off p. 9

## Preparation



1. **Place the TV on a solid surface.**
   For ventilation, leave at least 5 cm free all around the TV.
   Do not place the TV on a carpet.
   To prevent any unsafe situations, do not place any objects on top of the TV.
   Avoid heat, direct sunlight and exposure to rain or water.
2. **Insert the aerial plug** firmly into the aerial socket ╥ at the back of the TV.



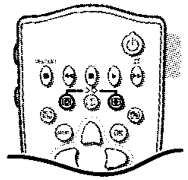
3. Insert the mains plug in the wall socket having a mains voltage of 220V-240V. To prevent damaging the mains (AC) cord which could cause a fire or electric shock, do not place the TV on the cord.
4. Remote control: Remove the cover of the battery compartment.
   Insert the 2 batteries supplied (Type R6-1.5V).

   *The batteries supplied do not contain the heavy metals mercury and cadmium. Nevertheless in many countries exhausted batteries may not be disposed of with your household waste. Please check on how to dispose of exhausted batteries according to local regulations.*

   *Note: this remote control functions with TVs which use the RC6 signalling standard.*
5. **Switch the TV on** : Press the power switch ⓘ on the front of your TV.
   A red indicator on the front of the TV lights up and the screen comes on.
   If the TV is in standby mode (see p. 8), press the **- P+** key on the remote control.
   *When you switch on your set **for the first time**, the menu* **LANGUAGE** *automatically appears on the screen. The explanation appears in different languages one at a time. Choose your own language and press the* **OK** *key on the remote control.*

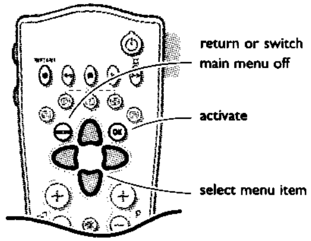
Go on to page 4, Store TV channels.

# Installation



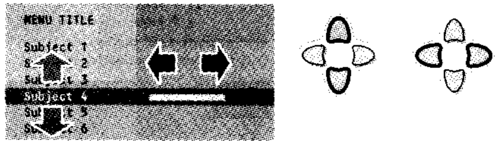
## Select the INSTALLATION menu

Press ⓪ and ⊜ at the same time.



## To use the menus

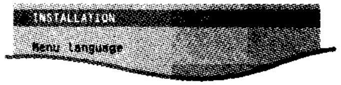
1. Use the cursor in the up/down, left/right directions to select a menu item.
2. Press the **OK** key to activate.
3. Use the **MENU** key to return or to switch the menu off.

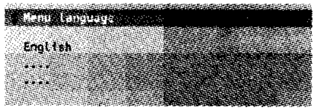


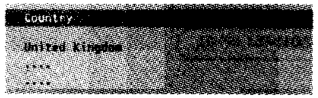
# Store TV channels

*After the new or extra TV channels have been stored, the TV automatically transfers those TV channels to the video recorder if it is equipped with the EasyLink function. The message **EasyLink : downloading ......** appears on the screen. The programme list of the video recorder is now the same as the one of the TV. If the TV is connected to a video recorder which supports the NEXTVIEWLink function, the TV also automatically transfers the language and country selections to the video recorder.*

## Select the menu language and country





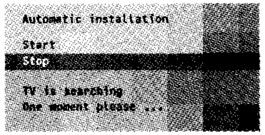


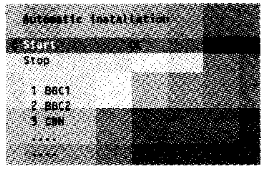
First, select your language and country.

1. Select **Menu language** and press the **OK** key.
2. Select your language and press the **OK** key.
   Use the cursor up/down to scroll through the list and to bring up other languages which are not displayed on the screen at present.
3. Select **Country** and press the **OK** key.
4. Select the country where you are now located and press the **OK** key.
   Use the cursor up/down to scroll through the list and bring up other countries which are not displayed on the screen at present.

   Select **Other** when none of the countries applies.

   You can now search for and store the TV channels in two different ways: using **automatic installation** or **manual installation** (tuning-in channel by channel).
   Select your choice and press the **OK** key.


Automatic installation
Start
Stop
TV is searching
One moment please ...


Automatic installation
Start
OK
Stop
1 BBC1
2 BBC2
3 CNN
....
....

## Automatic installation

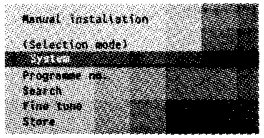
In the Automatic installation menu select **Start** and press the **OK** key to activate the searching. All TV channels are searched for and stored automatically.

If a cable system which broadcasts ACI (Automatic Channel Installation) or a TV channel transmitting a teletext page with the frequencies and programme names of all the TV channels which can be received, is detected, the search is stopped and a programme list appears.
The programme list is automatically filled with all the programme numbers and names of the TV channels transmitted.

*It is possible that the cable company or the TV channel displays a broadcast selection menu. Layout and items are defined by the cable company or the TV channel. Make your choice with the cursor and press the* ***OK*** *key.*

To exit from the menu press the **MENU** key on the remote control.

Go on to page 6.


Manual installation
(Selection mode)
System
Programme no.
Search
Fine tune
Store

## Manual installation

Searching for and storing TV channels is done channel by channel.
You must go through every step of the Manual installation menu.

**Selection mode** is only present and lights up if the country selected also offers the channel option (C-channels for aerial channels, S-channels for cable channels).
You can choose either channel or frequency mode.

❶ Select the TV system
Select the country or part of the world from where you want to receive the TV channel.
If you are connected to a cable system, select your country or part of the world where you are now located.

❷ Press the cursor down and enter the programme number with the digit keys.

❸ Search for a TV channel
Press the cursor left/right.
The frequency or the channel number increases until a TV channel is found.

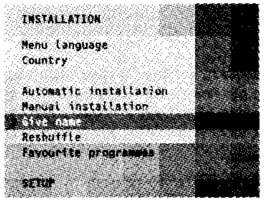
**Direct selection of a TV channel**
If you know the frequency, the C- or S-channel number, enter it directly with the digit keys 0 to 9.
Ask for a list from your cable company or dealer, alternatively consult the Table of frequencies on the inside backcover of this handbook.

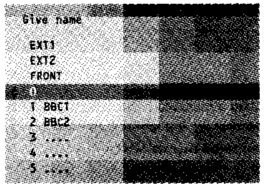
❹ Fine tune
In case of poor reception, you can improve the reception by adjusting the frequency with the cursor left/right.

❺ To store your TV channel, select **Store** and press the **OK** key.

Repeat steps ❶ to ❺ to store another TV channel.

❻ To exit from the menu press the **MENU** key on the remote control.


INSTALLATION
Menu language
Country
Automatic installation
Manual installation
Give name
Reshuffle
Favourite programmes
SETUP

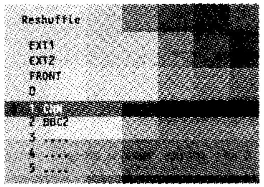

Give name
EXT1
EXT2
FRONT
0
1 BBC1
2 BBC2
3 ....
4 ....
5 ....

## Give name

It is possible to change the name stored in the memory or to assign a name to a TV channel which has not yet been entered. A name with up to 5 letters or numbers can be given to the programme numbers 0 to 99. For example SUPER, BBC1,... Between 99 and 0 you can also name any peripherals that are connected to a euroconnector.

❶ Select **Give name** in the **INSTALLATION** menu and press the **OK** key.
❷ Select the programme number.
❸ Press the **OK** key.
❹ Select the character with the cursor up/down.
❺ Select the following position with the cursor right.
❻ Select the following character.
❼ Press the **OK** key when finished.
❽ Press the **MENU** key to return to the **INSTALLATION** menu.

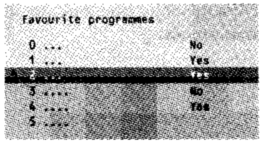
Space, numbers and other special characters are located between Z and A.


Reshuffle
EXT1
EXT2
FRONT
0
1 CNN
2 BBC2
3 ....
4 ....
5 ....

## Reshuffle the programme list

According to your preference you **can** change the order of the stored TV channels.

❶ Select **Reshuffle** in the **INSTALLATION** menu and press the **OK** key.
❷ Select the programme number you want to exchange.
❸ Press the **OK** key.
❹ Select the new number you want to exchange it with.
❺ Press the **OK** key.
Repeat the operation until all TV channels are allocated as you like.
❻ Press the **MENU** key to return to the **INSTALLATION** menu.


Favourite programmes
0 ... No
1 ... Yes
2 ... Yes
3 .... No
4 .... Yes
5 ....

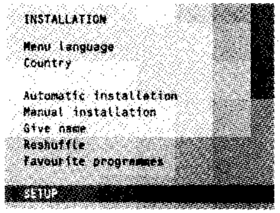
## Select Favourite TV channels

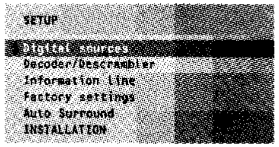
After leaving the installation you can browse through the TV channels by pressing the **- P +** key. Only those TV channels which are in the favourite list will be displayed. Non-favourite TV channels can still be selected with the digit keys. By default all stored channels are added to the favourite list.

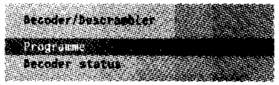
❶ Select **Favourite programmes** in the **INSTALLATION** menu and press the **OK** key.
❷ Select your favourite programme number.
❸ Select **Yes** or **No** with the cursor left/right.
❹ Repeat for every TV channel you want to make a favourite or a non-favourite TV channel.
❺ Press the **MENU** key to return to the **INSTALLATION** menu.

*In order for NEXTVIEW to function properly, the first TV channel from the favourite list should also broadcast the correct local date and time via teletext.*

## Install TV Setup







The Setup menu allows you to adjust initial settings, i.e. those which are not related to the installation of the TV channels.
The Setup menu contains items that control the settings of the TV's functions, features, services and peripherals you may have connected.

❶ Use the cursor in the up/down, left/right directions to select the menu item.
❷ Use the **OK** key to activate.
❸ Use the **MENU** key to return or switch menu off.

**Digital sources**
See Connect Peripheral Equipment, p. 20 to connect your digital equipment, like a DVD, a digital satellite tuner or a similar digital device.

**Define Decoder/Descrambler programme numbers**
If a decoder or a descrambler is connected, see p. 19 you can define one or more programme numbers as decoder programme numbers.

Press the cursor left/right to select the input used to connect to your decoder **Off, EXT1** or **EXT2**.
Select **Off** if you do not want the selected programme number being activated as a decoder programme number.

*Select* **EXT2** *when the decoder is connected to your EasyLink video recorder. When selecting the decoder, the message* ***EasyLink: downloading presets....*** *appears on the screen.*

**Information line**
Select **On** and after the selection of a TV programme or after pressing the i+ key on the remote control, a TV channel which broadcasts teletext may transmit the name of the TV channel, the programme name or another message. This is displayed on screen next to information about sound.
When selected **Off**, only sound information is displayed after the selection of a TV channel or after pressing the i+ key.

**Factory settings**
Select **Factory settings** and press the **OK** key to restore picture and sound settings, predefined in the factory.

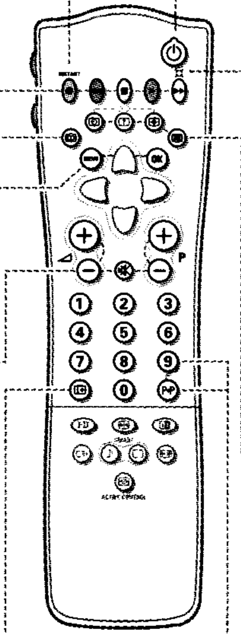
**Auto Surround**
Sometimes the broadcaster transmits special signals for Surround Sound encoded programmes. In that case, the TV automatically switches to the best Surround Sound mode when Auto Surround is switched on. Virtual Dolby will be reproduced, see p. 8.
Overruling this surround mode remains possible.

**Installation**
Select **Installation** and press the **OK** key to return immediately to the **INSTALLATION** menu.

❹ To exit from the menu press the **MENU** key repeatedly.

# Operation

## Use of the remote control



● **Instant record**
If your video recorder has the EasyLink function the **INSTANT** ● key for record can be operated in the TV mode.

● ◀◀ ■ ▶ ▶▶ **Video recorder** see p. 22

▤ **NEXTVIEW/TXT guide** on/off see p. 12

**MENU** **Main menu** on/off see p. 10

**OK** Press this key to activate your choice, when in the menus.

◢ **Volume**
Press + or - to adjust the volume.

🔇 **Mute**
Temporarily interrupt the sound or restore it.

**P** **Programme selection**
To browse through the TV channels activated in the Favourite Programme menu.

i+ **Screen information**
Press for 5 seconds to activate/de-activate the extended or reduced display of TV channel and programme information on the screen.
Press briefly to display information about the selected TV channel and programme, the sound reception, picture settings and the remaining time set with the sleeptimer.

⏻ **Standby**
The set is switched off.
To switch the TV on again, press - **P +** or the digit keys.
If your EasyLink video recorder has the system standby function and you press the standby key for 3 seconds, **both the TV and video recorder are switched to standby.**
*Your TV consumes energy in the standby mode. Energy consumption contributes to air and water pollution. We advise to switch off your TV overnight instead of leaving it on standby. You save energy.*

**Surround modes**
**Incredible Surround**
- In **MONO** sound mode, this feature, when switched on, enables you to hear a spatial effect of sound.
- In **STEREO** sound mode, when **Incredible Surround** is selected, it seems as though the loudspeakers are spread further apart from one another.

**Virtual Dolby** *(optimal with Dolby Surround signals)*
Virtual Dolby enables you to experience the effect of Dolby Surround Pro Logic, reproducing a rear sound effect

▤ **Teletext** on/off see p. 16

? ⊕ **Teletext functions** see p. 17

⏲ **Time display**
The time, downloaded from the TV channel (with teletext) stored on programme number **1** or the lowest favourite programme number, is displayed on the screen.
*This function is not available when continuous subtitles have been switched on.*

**0/9** **Digit keys**
To select a TV channel.
For a two digit programme number, enter the second digit within 2 seconds.
To switch immediately to a selected one digit TV channel, keep the digit key pressed a bit longer.

**P◁P** **Previous programme**
The previously selected TV channel is displayed.
The -/-- indication is only video recorder/DVD.

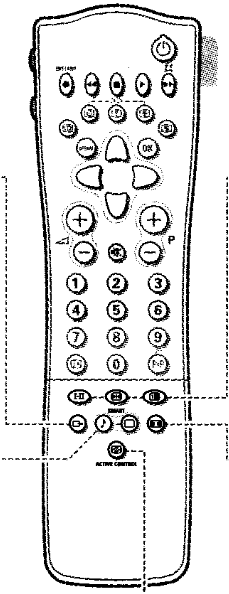
**⇥ Select peripherals**
Press this key repeatedly to select **EXT1**, **EXT2** or **FRONT**, according to where you connected the peripherals (p. 22).

**Smart Keys**
To select predefined picture and sound settings.

**♪ Smart Sound**
Each time it is pressed, a different sound setting is selected, corresponding with specific factory setting of the equalizer.

**☐ Smart Picture**
Each time it is pressed, a different picture setting is selected, corresponding with specific factory settings of Contrast, Colour, Sharpness and Dynamic Contrast.

**Personal** refers to the personal preference settings of picture and sound selected in the picture and sound menu.
*Remark: the moment you are in a predefined smart sound or picture setting and you modify a setting in the picture or sound menu, all values of the menu will overwrite the previously made settings.*



**I-II Bilingual choice and sound mode selection**
Press this key
- to switch from **Stereo** to **Mono** sound, in case of stereo transmission, or from **Nicam Stereo** to **Nicam available**, in case of digital transmission;
- to choose between language I (Dual I) or language II (Dual II), in case of bilingual transmission. The setting is separately stored for each TV channel.

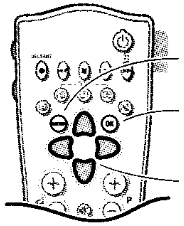
**Freeze**
To activate/de-activate the frozen picture or to hold a teletext page.

for future use

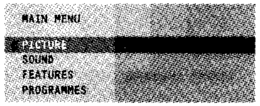
for future use

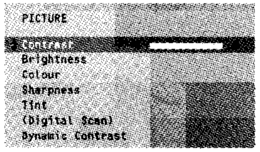
**Active control**
Active control is a pro-active and automatic system. The TV continuously measures and corrects all incoming signals in order to provide the best picture possible.
Press the key to select the Active Control values Off or On.
**Off** Sharpness and Dynamic Contrast are controlled automatically
**On** Sharpness, Dynamic Contrast and Noise Reduction are controlled automatically.
Press the cursor in the up/down directions while the selected Active Control setting information is on top of the screen.
The Active Control menu appears.
The picture settings are being adapted continuously and automatically.
The menu items cannot be selected.
Press the cursor in the up/down directions again to switch off the menu.

## Use of the menus


return or switch main menu on/off
**OK** key to activate
cursor to select adjustments

1. Press the **MENU** key to display/cancel the **MAIN MENU**.
2. Use the cursor in the up/down directions to select the **PICTURE, SOUND** or **FEATURES** menu or to select the **PROGRAMMES**.
3. Press the cursor right to activate the selected menu.
4. Use the cursor in the up/down, left/right directions to select the menu item.
5. Use the **OK** key to activate.
6. Press the **MENU** key repeatedly to **return** or to switch the menu off.


MAIN MENU
PICTURE
SOUND
FEATURES
PROGRAMMES


PICTURE
Contrast
Brightness
Colour
Sharpness
Tint
(Digital Scan)
Dynamic Contrast

## Picture menu

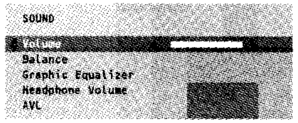
*If an NTSC peripheral is connected to one of the euroconnectors, the option Hue also appears.*

**Tint**
Select the colour temperature: **Normal**, **Warm** or **Cool**.

**Digital Scan** (Line Flicker Reduction) *(if provided)*
In certain circumstances while watching TV programmes it may be preferable to switch off the digital scan line flicker reduction.
Press the cursor left/right to select **On** of **Off**.

**Dynamic Contrast**
To make the contrast in the darker and the brighter picture areas more noticeable, select the **Med** setting.
In certain circumstances it may be preferred to select **Min, Max** or **Off**.

The modified adjustments for Contrast, Brightness, Colour, Sharpness, Tint, (Digital Scan) and Dynamic Contrast are automatically stored for all TV channels.
Select **Factory settings** in the Setup menu to restore the predefined factory settings, see p. 7.


SOUND
Volume
Balance
Graphic Equalizer
Headphone Volume
AVL

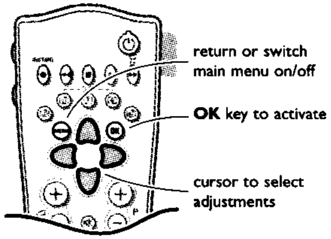
## Sound menu

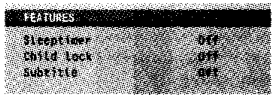
The modified adjustments for Volume, Balance, Treble and Bass are automatically stored for all TV channels.
Select **Factory settings** in the Setup menu to restore the predefined factory settings, see p. 7.

**Graphic Equalizer**
Here you can select the preferred sound setting which corresponds with the personal sound settings.

**Headphone volume**
See Connect Peripheral Equipment, p. 21, for the connection of the headphone.

**AVL (Automatic Volume Leveller)**
AVL automatically controls the volume level to avoid too large level differences, especially when switching to another programme or during commercial breaks.


return or switch main menu on/off
**OK** key to activate
cursor to select adjustments



## Features menu

❶ Press the **MENU** key to display/cancel the **MAIN MENU**.
❷ Use the cursor in the up/down directions to select the **FEATURES** menu.
❸ Press the cursor right to activate the selected menu.
❹ Use the cursor in the up/down directions to select a menu item.
❺ Use the cursor in the left/right directions to select the desired setting.

### Sleeptimer

With the sleeptimer you can set a time period after which the TV should switch itself to standby.
The counter runs from **Off** up to **180 min.**
One minute before the TV is set to go to standby, the remaining seconds appear on screen. You can always switch off your set earlier or change the set time.

### Child lock

If the child lock is on, the TV can only be switched on with the remote control. The **P** - and + keys on top of the TV cannot be used to select a TV channel. In this way you can prevent unauthorised use of your TV.
If the message **Child lock On** appears, the child lock must be switched off before you can use the **P** - and + keys on top of the TV to select a TV channel.

### Subtitle

TV channels with teletext often transmit certain programmes with subtitling. See Teletext, Continuous Subtitles, p. 18 how to select the proper subtitle page from the teletext index.
Select **Subtitle On** or **Off**.

Press the **MENU** key to switch off the Features menu.

## Programme list

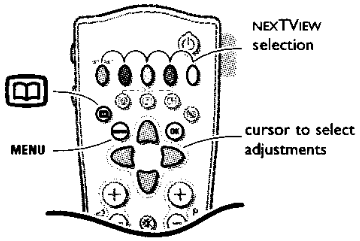
❶ Press the **MENU** key to display/cancel the **MAIN MENU**.
❷ Select **PROGRAMMES** with the cursor up/down.
❸ Press the cursor right to display an overview of all the TV channels installed.
❹ Press the cursor up/down to run through the list and press **OK** to select the desired TV channel.
❺ Press the **MENU** key to switch off the Programme list.

## NEXTVIEW / Teletext Guide

Today, most broadcasters in Europe, are offering teletext pages containing their programme schedule of today. These pages can be requested by switching the TV to **Teletext Guide**.
An increasing number of broadcasters are offering an extended programme guide service called **NEXTVIEW.** NEXTVIEW is a new way of presenting programme schedules and offers more features than common teletext.
With NEXTVIEW it is possible to show for instance all the movies coming tonight.

Both facilities are integrated in this TV: NEXTVIEW and Teletext Programme Guide. If a TV channel supports NEXTVIEW then the TV will automatically present the NEXTVIEW programme schedule. If the TV channel supports just teletext, then the TV will switch automatically to Teletext Guide.
Both facilities are offering the same functions: record, remind and info.
However in case of Teletext Guide the broadcaster is responsible if these functions are possible.
You can search for the programmes you want to watch up to 7 days in advance. It is also possible to search for a programme by theme, e.g. sport, movie, etc. Once a programme has been selected it can be tagged, to remind you, or to record on the video recorder automatically (provided the video recorder is equipped with NEXTVIEWLink, level 2.0), once, daily, weekly or series. Teletext Guide/NEXTVIEW also allows direct access to detailed information about programmes if provided by the broadcaster.

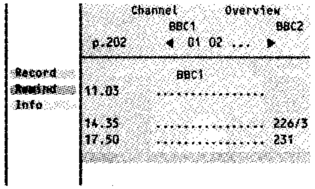
*The broadcaster is responsible for the contents of the information.*
*The TV is responsible for the capture of that information and for the presentation to the user.*



### Use of the Teletext Guide/NEXTVIEW menus

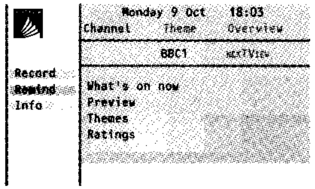
❶ Press the 🕮 key on the remote control to display/cancel the Teletext Guide/ NEXTVIEW menu.
❷ Use the cursor in the up/down, left/right directions to select the date, **CHANNEL** for the channel guide, **THEME** for the theme guide, **OVERVIEW** for an overview of all the programmes which are marked as reminders or for recording, the programme guide page number or to enter the programme list.

**Teletext Guide**

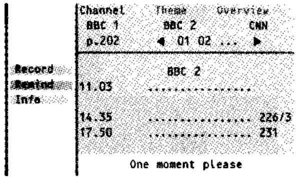


❸ Enter the proper programme guide page number with the digit keys or with the – **P** + keys.
❹ Press the cursor left/right to run through the subpages.
❺ Select a programme with the cursor up/down.
❻ Press one of the colour keys to select one of the basic functions (if available); **record, remind, info.** See Basic functions further on.
❼ Press the **OK** key to return to the header area again.

**NEXTVIEW**



❸ Select a programme with the cursor up/down.
❹ Press one of the colour keys to select one of the basic functions (if available); **record, remind, info.** See Basic functions further on.
❺ Press the **OK** key to return to the header area again.



Channel Theme Overview
BBC 1 BBC 2 CNN
p.202 ◄ 01 02 ... ►
Record
Remind
Info
BBC 2
11.03 ................
14.35 ................ 226/3
17.50 ................ 231
One moment please

## Teletext guide

TV channels which broadcast teletext also transmit a page with the programme guide of the day. For each selected TV channel the programme guide page can be selected with the ▣ key:

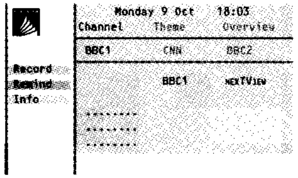
- automatically if the selected TV channel supports services like PDC (Programme Delivery Control) or MIP (Magazine Inventory Page).
- if automatic pre-selection is not possible then the index page is displayed and the proper programme guide page number of the selected TV channel has to be entered with the digit keys.

The programme guide page will be stored automatically only if it satisfies Video Programming via Teletext (VPT) requirements.

Every time you press the ▣ key, the programme guide page of the selected TV channel will be available if the TV channel does not support NEXTVIEW.

The function items record, remind and info, corresponding with the coloured keys, become highlighted if the displayed programme page satisfies the Video Programming via Teletext (VPT) requirements. Select a programme item and press one of the function keys, e.g. Record or Remind. See Basic functions further on.
The Info item is enabled if the selected programme contains a page number with an optional subcode referring to a page with more info about the programme.

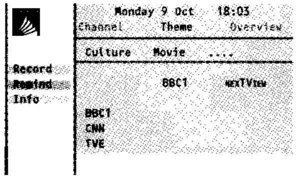
## NEXTVIEW modes to sort and represent information



Monday 9 Oct 18:03
Channel Theme Overview
BBC1 CNN BBC2
Record
Remind
Info
BBC1 NEXTVIEW
........
........
........

### Channel

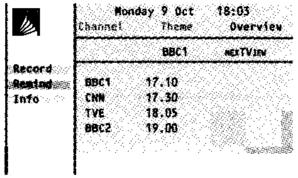
The Channel guide provides an overview of all programmes that are broadcast by a single channel during one day.
Already passed programmes can be made visible via cursor up.
The list will start with the earliest broadcast programme.
With cursor left/right another favourite TV channel can be selected.



Monday 9 Oct 18:03
Channel Theme Overview
Culture Movie ....
Record
Remind
Info
BBC1 NEXTVIEW
BBC1
CNN
TVE

### Theme

The theme guide displays a list of all programmes at the selected date, that matches with the selected category (news, sport, culture, movies, ...).
The default starting item will be the current or next programme on the current TV channel.
The **THEME** selection is only present if programmes in the TV guide have defined themes.



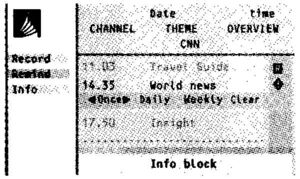
Monday 9 Oct 18:03
Channel Theme Overview
BBC1 NEXTVIEW
Record
Remind
Info
BBC1 17.10
CNN 17.30
TVE 18.05
BBC2 19.00

### Overview

The Overview menu provides a list of programmes that are marked as reminders or to be recorded each day.
When more than one programme to be recorded has an overlap in time, these programmes will be marked by a red colour.

After the programme has been broadcast, all items set for once will be deleted from the list the following day. This menu can be used to change a reminder or recorder.

*Note: the TV will automatically interpret the broadcast time (as shown on the teletext guide) of your selected programme into the correct local time and date.*



Date time
CHANNEL THEME OVERVIEW
CNN
Record
Remind
Info
11.03 Travel Guide R
14.35 World news ◆
◄Once► Daily Weekly Clear
17.50 Insight
Info block

## Basic functions

The functions Record, Remind and Info can be activated with the corresponding colour keys on the remote control.
If the function is not available, then the text is shown at reduced brightness.
Select a programme with the cursor up/down.

### Record R or Remind ◆

❶ Press the red colour key to activate **Record** or the green colour key to activate **Remind.**
*If the programme number of the broadcaster is not yet known, a message appears with the request to input the correct programme number with the cursor left/right and press OK.*
A small menu pops up in which you can choose the interval: once, daily or weekly, or clear an earlier made record or remind setting. The default interval is set to **Once.** If a programme is an episode of a series, it is identified by the system and the options **daily** and **weekly** are replaced by the option **series.** In this case the system identifies when the next episode of the series will be broadcast. This is not possible in the Teletext guide.

❷ Use the cursor in the left/right directions to select the interval.
The colour of the tag refers to the interval.

❸ Press the **OK** key.

When **Record** R is activated:
**Storing** is displayed to indicate the video recorder is programmed.
When **Remind** ◆ is activated:
- a message will be displayed the moment the tagged programme with ◆ starts, when watching the TV later on.
- the TV switches on the moment the tagged programme with ◆ starts, when the TV is in standby.

*Note: Recordings and reminders are not possible when the broadcaster does not transmit dates and times of the programmes.*
*The message **No TV programming possible** appears.*
*Make sure you are on the TV programming page.*

### Info

❶ Press the yellow colour key to activate **Info.**
Advertisements or information relating to the selected programme are displayed. In some cases all of the information does not fit on the screen. Use the cursor up/down to browse through all the information.

❷ Press the yellow colour key again to switch off the information.

## Acquisition and updating of NEXTVIEW information

Acquisition and updating of NEXTVIEW is done when you are watching a TV channel supporting NEXTVIEW.

## Video recorder restrictions with NEXTVIEW

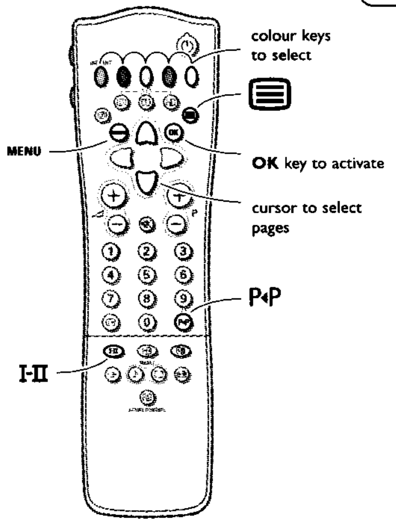
The **Record** item and the automatic recording will only be present and possible if your video recorder is equipped with NEXTVIEWLink.
Your video recorder should be connected to **EXTERNAL 2**. See Connect Peripheral Equipment, p. 19.

The daily, weekly and series options, the number of recordings set and the way overlapping recordings are managed, depend on the type of video recorder you have. When all video recorder timers are full, the item **Record** in the menu will not be present.

Upload video recorder overview *(only with Philips sets)*
When the TV is switched on, the timer recordings are uploaded to the TV to check if any manual addition or deletions have been done. This is shown in the overview.
The video recorder manages and removes timer recordings when performed.

Some NEXTVIEWLink video recorders do not allow a daily programming of the recording to start on a Saturday or Sunday. In this case the item **daily** will be removed from the menu on those days.

# Teletext



Most TV channels broadcast information via teletext.
Each channel which broadcasts teletext transmits a page with information on how to use its teletext system. Look for the teletext page with the main index (usually p. 100).
Depending on the TV channel, teletext is transmitted in different systems.
The colours used in the options line correspond with the colour keys of your remote control.

## About Easy Text

Easy Text considerably reduces the waiting time (on condition that the teletext broadcast of the particular TV channel is received for at least half a minute) by :

- a direct selection of previous and following pages which are in transmission and of the pages referred to in the options line
- a habit watcher list: frequently used pages are put automatically in a list of preferred pages, so that they are immediately available
- the precapturing of the page numbers referred to in the displayed page
- the precapturing of all the subpages.

## Switch Teletext on and off

Press ≣ to switch the teletext on or off.
The main index page appears on the screen together with two information lines at the top and one option line at the bottom of the screen.

*Remark: if the displayed teletext characters on screen do not correspond with the characters used in your language, press the* **I-II** *key repeatedly to select Language group 1 or 2.*

## Select a Teletext page

**With the digit keys**
Enter the desired page number with the digit keys.
The page counter seeks the page or the page appears immediately when the page number has been stored in the memory.
*A message appears when you have entered a non existent or incorrect page number. Page numbers beginning with 0 or 9 do not exist. Choose another number.*

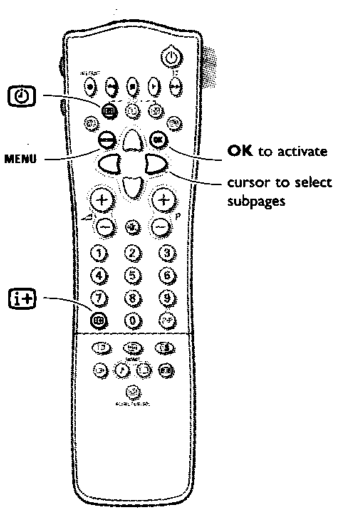
**With the option line**
Select with the colour keys, corresponding to the coloured options at the bottom of the screen, the desired subject.

## Quickly run through the teletext pages

Press the cursor up/down or the **- P +** key to run through the previous or the following pages.

## Select the previously selected txt page

Press the P<P key.



## Select the index teletext page

Press the white colour key to display the main index (usually p.100).

**Only for T.O.P teletext broadcasts :**
T.O.P orders the pages in categories and adds other possibilities of enhancing ease of use.
Press [i+]. A T.O.P. overview of the teletext subjects available is displayed.
Not all TV channels broadcast T.O.P. teletext. When the teletext system is not T.O.P. teletext, a message appears at the top of the screen.
Select with the cursor up/down, left/right the desired subject and press the **OK** key.

## Select subpages

When a selected teletext page consists of different subpages, one of the subpages appears on the screen.
The coloured number in the first information line refers to the displayed subpage.
The other subpages can be selected in 2 ways :

**With the cursor left/right**
The other subpage numbers appear in white as soon as the transmission has found them. They are stored in the memory so that they are available while the teletext page is on screen.
Select with the cursor left/right the previous or the following subpage.

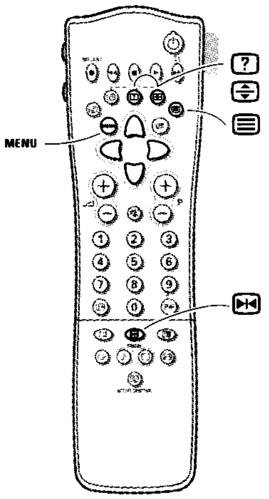
**With the ◎ key**
- Enter the subpage number yourself:

Press ◎. Enter the desired subpage with the digit keys : e.g. 3 for the third page of seven subpages.
The TV searches for the selected subpage.

- Automatically rotating subpages:

Press ◎ again to cancel the entered digit key for the subpage.
Now the subpages rotate automatically.

Press ◎ again to select the subpages with the cursor left/right again.



## Special teletext functions

**Hold**
Press ▶◀ to stop the automatically rotating of the subpages or to stop the page counter from seeking when you have entered a wrong page number or when the page is not available.
Enter another page number.

**Enlarge**
Press ⇕ repeatedly to display the upper part, the lower part and then to return to the normal page size. When the upper part is displayed, you can scroll the text, line by line using the cursor up/down.

**Reveal**
Press ? to reveal/conceal the hidden information, such as solutions to riddles and puzzles.

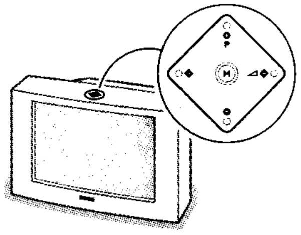
## Select Continuous Subtitles

TV channels with teletext often transmit programmes with subtitling. For each TV channel you can store a subtitle page which will be displayed continuously if the programme being broadcast is transmitted with subtitles.

Switch on teletext and select the proper subtitle page from the index.
Switch off teletext.
Now the subtitle page is stored for the selected TV channel.

Once subtitles have been stored and **Subtitle On** has been selected they will automatically be displayed on the selected TV channel if subtitles are in the transmission.
Select **Subtitle On** or **Off** in the Features menu, see p. 11.
The subtitle symbol ▭ appears when **Subtitle On** is selected.

*Remark: you are in teletext mode, so only teletext functions are available.*



## Keys on top of the TV

Should your remote control be lost or broken you can still change some of the basic picture settings with the keys on top of the TV.

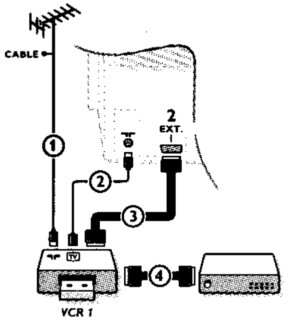
Press the **M** key repeatedly to select **Volume**, **Brightness**, **Colour**, **Contrast**.
Press the **P** - or + keys to carry out the selected adjustment.
When the menu adjustment is not displayed, the **P**- or + keys enable you to select the TV channels, the ◿ - or + keys to adjust the volume.

*The selected adjustment automatically switches off when no action has been executed for 10 seconds.*

# Connect Peripheral Equipment

There is a wide range of audio and video equipment that can be connected to your TV. The following connection diagrams show you how to connect them.

## Video recorder



Connect the aerial cables ①, ② and, to obtain the optimum picture quality, eurocable ③ as shown opposite.

*If your video recorder is provided with the EasyLink function, the eurocable supplied with it should be connected to* ***EXTERNAL 2*** *to benefit from the EasyLink functionality.*

If the eurocable ③ is not used the following steps are required:

**Search for and store the test signal of the video recorder**

❶ Unplug the aerial cable ① from the aerial socket ⊤ of your video recorder.

❷ Switch on your TV and put the video recorder on the test signal. (See the handbook for your video recorder.)

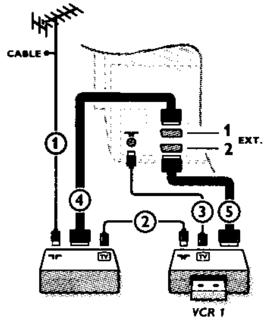
❸ Search for the test signal of your video recorder in the same way as you searched for and stored the TV signals. See Installation, Searching for and storing TV channels, Manual installation, p. 5.

❹ Store the test signal under programme number 0 or between 90 and 99.

❺ Replace the aerial cable in the aerial socket ⊤ of your video recorder after you have stored the test signal.

**Decoder and video recorder**
Connect a eurocable ④ to your decoder and to the special euroconnector of your video recorder. See also the video recorder handbook.
See Define Decoder/Descrambler prog. numbers, p. 7.
You can also connect your decoder directly to **EXTERNAL 1** or **2** with a eurocable.

## Video recorder and other peripherals (except Digital Sources)



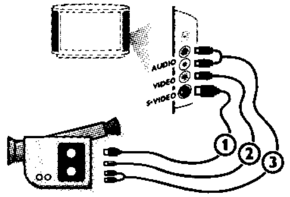
❶ Connect the aerial cables ①, ② and ③ as shown opposite. Better picture quality can be obtained if you also connect eurocable ⑤ to **EXTERNAL 2** and a eurocable ④ to **EXTERNAL 1**.

❷ Look for the test signal of your peripheral in the same way as you do for a video recorder.

*When a video recorder is connected to* ***EXTERNAL 1*** *you can only record a programme from your TV.*
*Only when a video recorder is connected to* ***EXTERNAL 2*** *it is possible to record a programme from your TV as well as from other connected equipment. See Record with your video recorder, p. 24.*

*Note: EXTERNAL 1 can handle CVBS and RGB, EXTERNAL 2 CVBS and Y/C.*

## Camera & camcorder



❶ Connect your camera or camcorder to sockets at the right side of your TV.

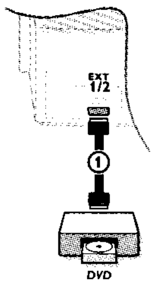
❷ Connect the equipment to **VIDEO** ② and **AUDIO L** ③ for mono equipment.

Press the I-II key repeatedly to select the sound coming from one or both loudspeakers of your TV.

❸ For stereo equipment also connect **AUDIO R** ③.

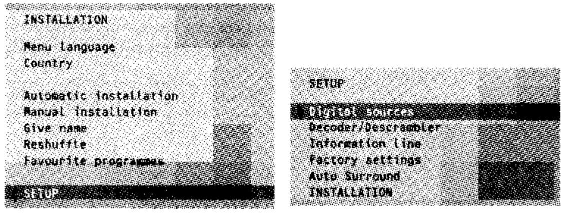
S-VHS quality with an S-VHS camcorder is obtained by connecting the S-VHS cables with the **S-VIDEO** input ① and **AUDIO** inputs ③.

## Digital equipment (DVD, digital satellite tuner,...)



Connect your digital equipment with a eurocable ① to one of the euroconnectors (**EXT1** or **EXT2**), or with a cinch cable to the **VIDEO** input at the right side of the TV (see illustration above).

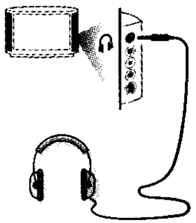
❶ Press ⊡ and ⊕ at the same time.



❷ Select **Digital sources** in the Setup menu of the **INSTALLATION** menu and select:
- **None** if you have no digital source connected,
- **EXT1** or **EXT2** if you have connected your equipment to a euroconnector,
- **FRONT** in case you have connected your equipment to the right side of the TV.

❸ Press the **MENU** key to switch off all menus.

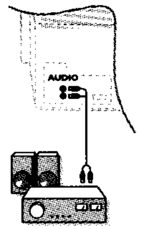
*Note: the low quality of some digital picture material may be the cause of digital image distortion. In this case select* ***Eco*** *under the* ***SMART PICTURE*** ▢ *key on the remote control as this setting is intended to improve distorted picture quality.*



## Headphone

1. Insert the plug into the headphone socket 🎧 at the right side of the TV.
2. Press 🔇 on the remote control to switch off the internal loudspeakers of the TV.
   *The headphone impedance must be between 8 and 4000 Ohm.*
   *The headphone socket has a 3.5 mm jack.*

In the **SOUND** menu select **Headphone volume** to adjust the headphone volume, see p. 10.

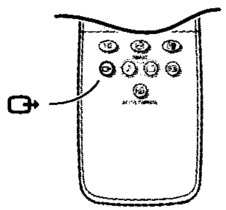


## Audio equipment / Amplifier

Connect the audio cables to the audio input of your audio equipment and to **AUDIO L** and **R** at the back of your TV.

You can listen to your TV sound via your audio equipment.

If you want to connect more equipment to your TV, consult your dealer.



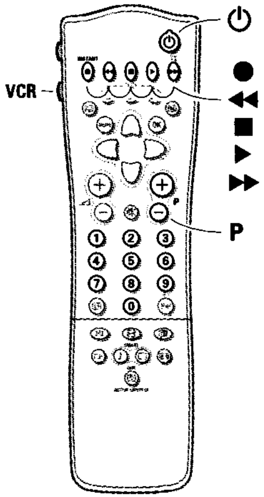
## To select connected equipment

*If the TV is connected to a video recorder with the EasyLink function, in some cases the TV will be switched on, even when it was in standby. (E.g. playback tape,...)*
*This is not possible when Child lock On is selected.*

**Equipment connected with an aerial cable only :**
Select the programme number under which you have stored the test signal with the digit keys.

**Equipment connected to a euroconnector or to the right side of the TV**
Press the ⇥ key repeatedly to select **EXT1**, **EXT2** or **FRONT**, according to where you connected your equipment at the back or the right side of your TV.
*Remark : Most equipment (decoder, video recorder, satellite receiver) carries out the switching itself.*

**If you want to change to TV channels?**
Enter the programme number of the TV channel which you want to watch with the digit keys or press the ⇥ key repeatedly to select **TV**.



## Audio and video equipment keys

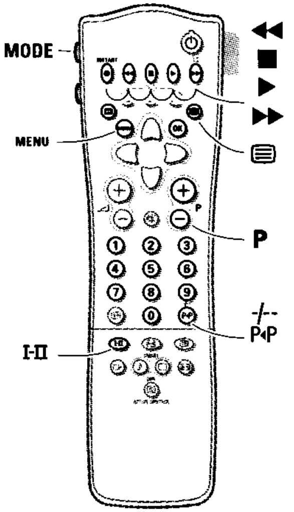
Most of the audio and video equipment from our range of products can be operated with the remote control of your TV.

**Video recorder**
Keep the **VCR** key on the left side of the remote control pressed and simultaneously press:

| | |
|---|---|
| ● | for record, |
| ◀◀ | for rewind, |
| ■ | for stop, |
| ▶ | for play, |
| ▶▶ | for fast forward, |
| -/-- | for selecting 1- or 2-digit programme numbers from the video recorder, |
| - P + | for sequential programme selection from the video recorder tuner, |
| 0 to 9 | to select a programme number from your video recorder tuner, |
| ⏻ | to switch the video recorder to standby |

*These keys function with equipment which use the RC5 signalling standard.*

*If your video recorder has the EasyLink function, the key* **INSTANT** ● *for recording, can be operated in the TV mode.*
*If your EasyLink video recorder has the system standby function, when you press the* ⏻ *key for 3 seconds, both TV and the video recorder are switched to standby.*



**Satellite receiver**

Press the **OK** key simultaneously with the digit key 1.
Now you can operate your satellite receiver with the remote control of your TV.

Keep the **MODE** key on the left side of the remote control pressed and simultaneously press:

| | |
|---|---|
| **MENU** | to switch the **SAT** menu on or off |
| -/-- | to select a one or two digit programme number from the satellite receiver. |

*These keys function with equipment which use the RC5 signalling standard.*

**DVD player**

Press the **OK** simultaneously with the digit key 2.
Now you can operate your DVD player with the remote control of your TV.

Keep the **MODE key** on the left side of the remote control pressed and simultaneously press:

| | |
|---|---|
| **MENU** | to switch the DVD menu on or off |
| ▤ | to select a DVD title |
| P◂P | to select a DVD chapter |
| I-II | to select your choice of audio language |
| ◀◀ | to search down |
| ■ | stop |
| ▶ | play |
| ▶▶ | to search forward |
| 0-9 | to select a programme number from your DVD |
| **OK** | to enter the selected menu item |

●, ⏻, ?, ⊕, ⇨ have no function

*Note: after replacing the batteries the default operational equipment is the satellite receiver.*

*These keys function with equipment which use the RC6 signalling standard.*

## Record with your video recorder

To record S-VHS quality, connect an S-VHS peripheral directly to the video recorder.

**Record a TV programme**

❶ Select the programme number on your video recorder.
❷ Set your video recorder to record.
See the handbook for your video recorder.

*Switching programme numbers on your TV does not disturb recording !*

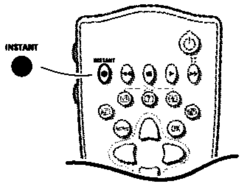
**Record a programme on your video recorder connected to EXTERNAL 2 from Audio/Video equipment connected to EXTERNAL 1 or to sockets on the right side of the TV**

❶ Switch on the equipment.
❷ Select the right external on your video recorder.
❸ Set your video recorder to record.
**You record what you are watching on the screen.**

*Do not switch programme numbers or do not switch off your TV when you are recording !*

## Record with your video recorder with EasyLink

*If you have connected an S-VHS video recorder provided with the EasyLink function, you can record S-VHS-quality from an S-VHS peripheral connected to the right side of the TV. (E.g. from an S-VHS camcorder.)*



*In TV mode, it is possible to start a direct recording of the programme which is being displayed on the TV screen.*
*Press the* **INSTANT** ● *record key of the remote control.*
*The video recorder switches on from standby and a message of what is being recorded appears on the screen.*
*The video recorder starts recording the programme you are watching.*
*Switching programme numbers on your TV does not disturb recording !*

*When recording a programme from a peripheral connected to EXTERNAL 1 or FRONT, you can not select another TV programme on the screen.*
*To watch TV programmes again, press the programme number you want to select twice.*
*Attention: the recording is stopped and your video recorder switches to standby.*

## Record with your video recorder with NEXTVIEWLink

*If your video recorder is equipped with NEXTVIEWLink, and you tagged one or more programmes to be recorded automatically in the NEXTVIEW mode, it is not necessary for the TV to be in the standby mode or switched on for the recording to start.*

# 4. Mechanical instructions

## 4.1 Accessing the service connector (for ComPair)

1. Remove the 'Service Connector' cover, see Figure 4.1.
2. Connect the ComPair cable (for more info see chapter 5).
3. Start ComPair and perform the diagnosis.

## 4.2 Removing the Rear Cover

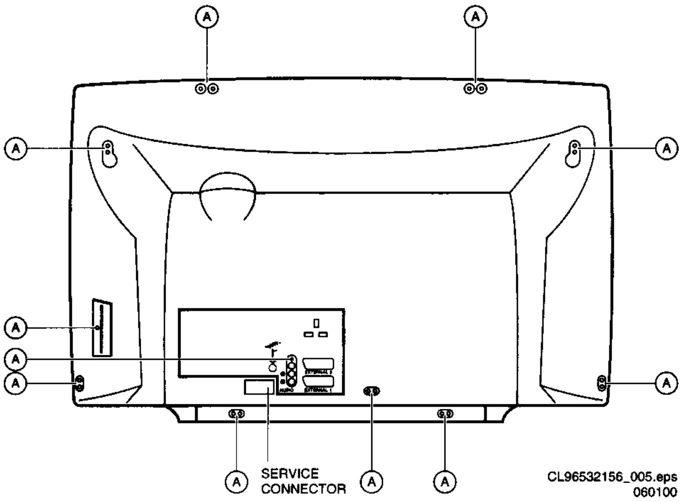

A
A
A
A
A
A
A
A
A
SERVICE CONNECTOR
A
A
CL96532156_005.eps
060100

**Figure 4-1**

1. Remove the fixation screws (A) of the rear cover, notice also the screw for the side-I/O.
2. Now the rear cover can be removed.

## 4.3 Service position

The following PWB's are present in this chassis (see also 'Chassis overview', chapter 1):
1. Large Signal Panel (LSP)
2. Small Signal Board (SSB)
3. Top Control panel
4. CRT panel (or PTP)
5. Side I/O panel
6. Mains Switch/LED panel

### 4.3.1 Service position LSP

Position 1: For better accessibility of the LSP, do the following (figure 4.2):

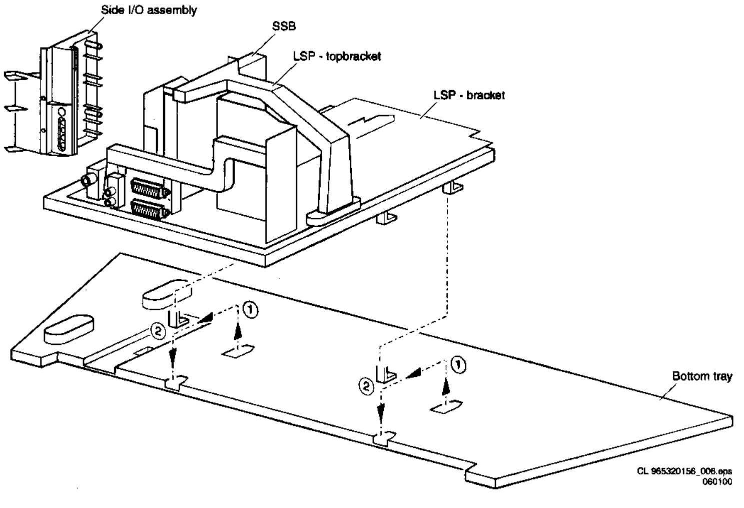

Side I/O assembly
SSB
LSP - topbracket
LSP - bracket
①
②
①
②
Bottom tray
CL 965320156_006.eps
060100

**Figure 4-2**

1. Remove the LSP-bracket from the bottom tray by pulling it backwards.
2. Hook the bracket in the first row of fixation holes of the bottom tray. In other words reposition the bracket from (1) to (2).

Position 2: To get access to the bottom side (solder side) of the LSP, do the following (figure 4.3):

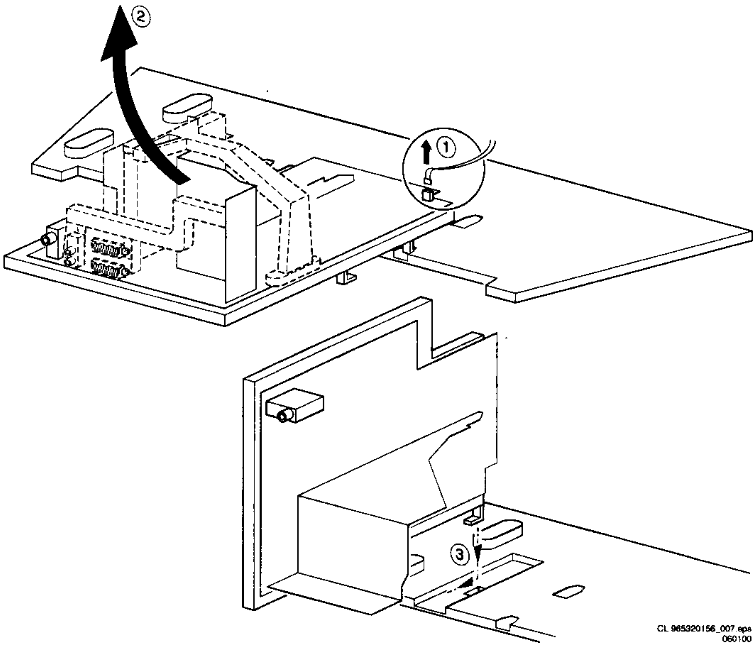

②
①
③
CL 965320156_007.eps
060100

**Figure 4-3**

1. Disconnect the degaussing coil from the LSP by removing the cable on connector 0020 (1).
2. Release the wiring from the heatsink fixation clamps, in order to get room for repositioning the LSP.
3. Turn the LSP 90 degrees clockwise (2) and place it in the fixation hole at the left side of the bottom tray (3).

### 4.3.2 Service position SSB

In fact there is no predefined service position for the bottom (B-) side of the SSB. All relevant test points are located on the A-side (side that is facing the Tuner).
If IC's must be replaced: take the complete panel out of the SIMM-connector.
To get access to the SSB test points, do the following:

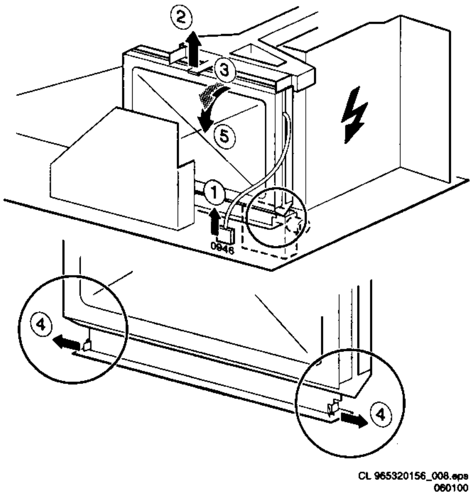

②
③
⑤
①
0946
④
④
CL 965320156_008.eps
060100

**Figure 4-4**

1. Put the LSP in service position 1 (as described above).
2. Disconnect the IF-cable from connector 0946 (1).
3. Release the 'top fixation clamp' which holds the SSB (2) and pull the SSB slightly towards the Tuner (3). At the same time, the 2 metal clamps at both sides of the SIMM-connector must be released (4) and the complete SSB can be taken out now by pulling the top-side of the SSB towards the Tuner (5). It 'hinges' in the SIM-connector.

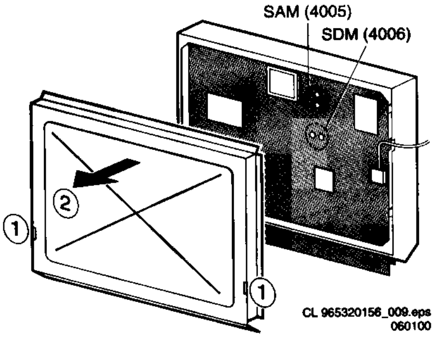


Figure 4-5

1. Once the SSB has been taken out of the connector, the A-side shielding can be removed.
2. After removal of the shielding, the panel can be replaced in its connector in reverse order. Don't forget to reconnect the IF-cable.
3. If necessary for the measurement, the LSP can be put in 'service position 2' (as described above).

### 4.3.3 Accessing the Top Control panel

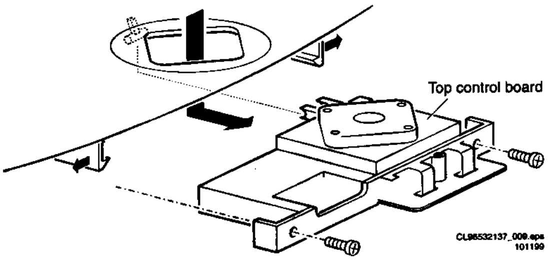


Figure 4-6

1. Remove the two screws.
2. Pull the board backward.

### 4.3.4 Accessing the Side I/O panel

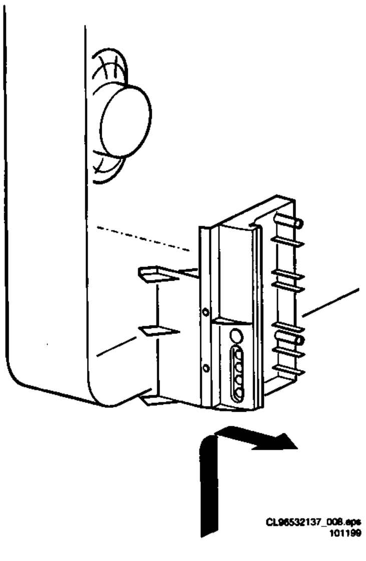


Figure 4-7

1. The complete Side I/O-assembly can be lifted out of the hinge for servicing.
2. The board can easily be removed out of the bracket by releasing the fixation clamps.

### 4.3.5 Accessing the Mains Switch/LED panel

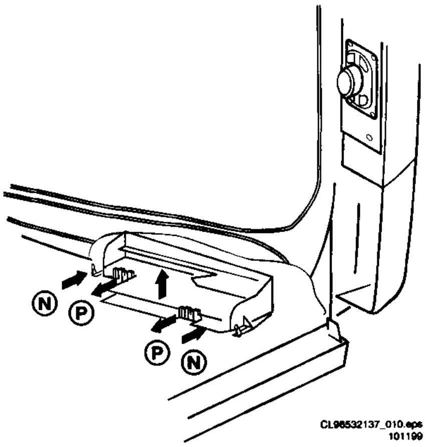


Figure 4-8

1. Release the two fixation clamps (N) by pushing them upward.
2. At the same time, the complete assy must be pulled backward (P).
3. If necessary, the light guide can be replaced now.
4. The 'Mains Switch/LED'-panel can be removed now by releasing the clamps of the bracket.

## 4.4 Mounting the Rear Cover

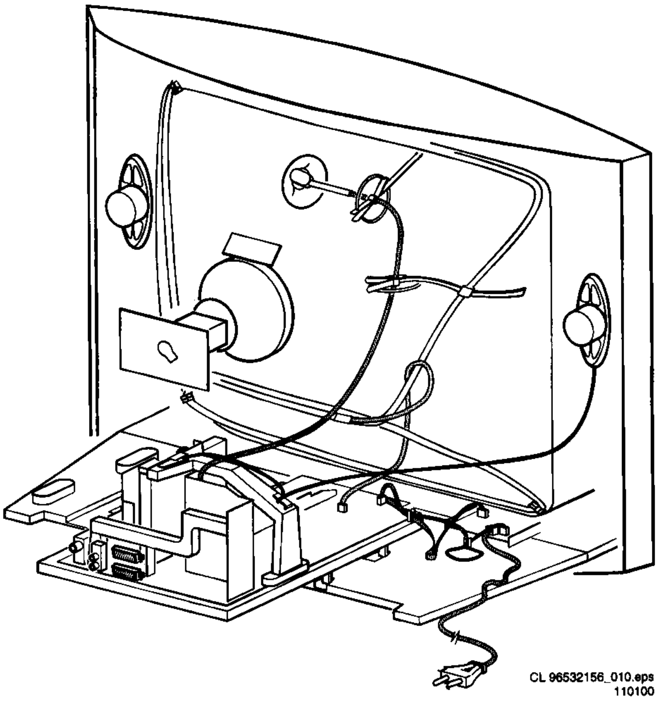


Figure 4-9

Before mounting the Rear Cover, some checks has to be performed:

- Check whether the Mains Cord is mounted correctly in the guiding brackets.
- Check whether all cables are replaced in their original position. This is very important due to the large 'hot' area of the set. Special attention must be paid to the right Loudspeaker cable and the degaussing cable.

# 5. Service modes, error codes, protections, faultfinding and repair tips

In this chapter the following paragraphs are included:

1. Test points.
2. Service modes.
3. Problems and solving tips (related to CSM).
4. ComPair.
5. Error codes.
6. Protections.
7. Repair tips.

## 5.1 Test points

The EM2E chassis is equipped with test points in the service printing. These test points are referring to the functional blocks:

- P1-P2-P3, etc. on LSP: Test points for the power supply.
- L1-L2-L3, etc. on LSP: Test points for the line drive and line output circuitry.
- F1-F2-F3, etc. on LSP: Test points for the frame output circuitry.
- R1-R2 on LSP: Test points for the rotation circuitry.
- A1-A2-A3, etc.: Test points for the audio circuitry.
- I1-I2-I3, etc. on SSB:Test points for the Tuner/IF part.
- S1-S2-S3, etc. on SSB: Test points for the synchronisation circuitry.
- V1-V2-V3, etc. on SSB: Test points for the video processing circuitry.
- C1-C2-C3, etc. on SSB: Test points for the control and teletext circuitry.
- F1F-F2F-F3F, etc.: Test points for the CRT-panel circuitry.
- SC1-SC2-SC3, etc: Test points for the SCAVEM circuitry.

The numbering is done in a for diagnostics logical sequence; always start diagnosing within a functional block in the sequence of the relevant test points for that functional block.

## 5.2 Service modes and ComPair

### 5.2.1 Service Default Mode (SDM)

The purpose of the SDM is to provide a situation with predefined settings to get the same measurement results as given in this manual.

Specification of the SDM:

- Tuning frequency 475.25 MHz.
- TV-system for BGLM sets set to BG.
- All picture settings at 50 % (brightness, colour, contrast, hue).
- All sound settings at 50 % except volume at 25 % (so bass, treble, balance at 50 %, volume at 25 %).
- All service-unfriendly modes are disabled (like sleep timer, child lock, blue mute, AVL and SDLP).

Entering the SDM can be done in 4 ways:

- Via a standard RC-handset by entering the code '062596' followed by the 'MENU' button (it is possible that, together with the SDM, the main menu will appear. To switch it off, push the 'MENU' button again).
- Via ComPair.
- By the 'DEFAULT' button on the DST while the set is in the normal operation mode.
- By short-circuiting for a moment the two solder-pads with the indication 'SDM' (item 4006) on the A-side of the SSB (activation can be performed in all modes except when the set has a problem with the main-processor).

Note: If the SDM is entered via the pins, all the software-controlled protections are de-activated.

Exiting the SDM can only be done via the STANDBY command. By switching off-on the set with the mains switch the set will come up again in the SDM.

### 5.2.2 Service Alignment Mode (SAM)

The purpose of the SAM is to align the set and/or adjust the settings.

Specification of the SAM:

- Software alignments (see chapter 8).
- Option settings (see chapter 8).
- Error buffer reading and erasing. The most recent error code is displayed on the left side.
- Operation counter.
- Software version.

Entering the SAM can be done in 4 ways:

- Via a standard RC-handset by entering the code '062596' followed by the 'OSD' button [i +] (it is possible that, due to the button sequence, the channel will change to channel 9. To return to the channel of your selection, push the appropriate button on the RC).
- Via ComPair.
- By the 'ALIGN' button on the DST while the set is in the normal operation mode (or SDM). Enter the password '3140' and press OK.
- By short-circuiting for a moment the two solder-pads with the indication 'SAM' (item 4005) on the A-side of the SSB (activation can be performed in all modes except when the set has a problem with the main-processor).

Note: If the SAM is entered via the pins, all the software controlled protections are de-activated.

The Service Alignment Mode menu will now appear on the screen. The following information is displayed:

- Date: the software date.
- ID: the software version of the ROM (Example: EM2E11.0_01501. This software-code stands for EM2E (chassis), E = Europe, 1 = language, 1.0 = software version, xxxxx = latest 5 digits of 12nc code software).
- Operation Hours: the accumulated total of operation hours.
- Errors: followed by maximal 10 errors. The most recent error is displayed at the upper left. For explanation errors see (table 5.1).
- Defect. Module: here the module that generates the error is displayed. If there are multiple errors in the buffer that have not all been generated by a single module, there is probably another defect. The message 'Unknown' will then be displayed here.
- Reset Error Buffer: pressing the 'OK' key can reset the error buffer.
- Functional Test: all devices are tested via the 'OK' key. Eventual errors are displayed in the error buffer. The error buffer is not erased, the content returns when the Functional Test is terminated.
- Alignments: this enables the Alignments sub-menu to be called up.
- Dealer Options: extra features for dealers.

Exiting the SAM can be done via the 'MENU' command or via switching OFF-ON the set with the mains switch.

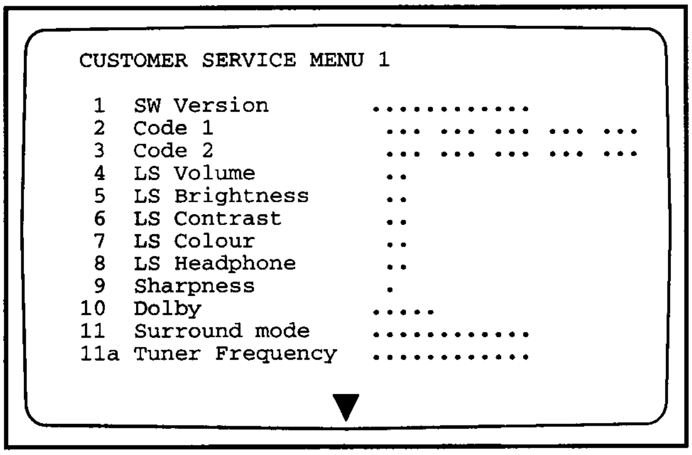
### 5.2.3 Customer Service Mode (CSM)

All EM2E sets are equipped with the 'Customer Service Mode' (CSM). This 'Customer Service Mode' is a special service mode, which can be activated and deactivated by the customer upon request of the service technician/dealer during a telephone conversation in order to identify the status of the set. This CSM is a 'read only' mode, therefore modifications in this mode are not possible.

Switching-on of the Customer Service Mode:
The Customer Service Mode will switch-on after pressing simultaneously the 'MUTE' knob on the remote control handset and the 'MENU' button on the TV for at least 4 seconds. This activation only works if there is no menu on the screen.

Switching-off the Customer Service Mode:
The Customer Service Mode will switch-off after pressing any key of the remote control handset (with exception of the 'cursor-up' and 'cursor-down' keys), or the buttons on the TV or by switching off the TV set with the mains switch.

***Detailed explanation of the Customer Service Mode***
After switching on the Customer Service Menu the following screen will appear:



```
CUSTOMER SERVICE MENU 1

  1  SW Version        ............
  2  Code 1              ... ... ... ... ...
  3  Code 2              ... ... ... ... ...
  4  LS Volume         ..
  5  LS Brightness     ..
  6  LS Contrast       ..
  7  LS Colour         ..
  8  LS Headphone      ..
  9  Sharpness         .
 10  Dolby             .....
 11  Surround mode     ............
11a  Tuner Frequency   ............

                    ▼
```

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Figure 5-1

Note: Following text is an explanation of the CSM. Be aware that these descriptions are depending on the set hardware.

Line 1:
Software version; the build in software version (AAABCX.Y)

- AAA = chassis name (EM1 = Painter processor, EM2 = OTC processor)
- B = country (E = Europe, A = Asian Pacific, U = USA)
- C = 1 (language cluster)
- X = main version number
- Y = sub version number

Details on the software version can be found in the chapter 'Software Survey' of the publication 'Product Survey - Colour Television'.

Line 2:
Code 1; gives the last 5 errors of the error buffer. As soon as the built-in diagnose software has detected an error the buffer is adapted.

Line 3:
Code 2; gives the first 5 errors of the error buffer. As soon as the built-in diagnose software has detected an error the buffer is adapted.
The last occurred error is displayed on the leftmost position of code 2. Each error code is displayed as a 3 digit number. When less than 10 errors occur, the rest of the line(s) is (are) empty. In case of no errors the text 'No Errors' is displayed. See paragraph 5.5 of this chapter for a description of the error codes.

Line 4:
LS Volume; gives the Last Status of the volume as set by the customer for this selected transmitter. The value can vary from 0 (volume is minimum) to 24 (volume is maximum). Volume values can be changed via the volume key on the remote control handset.

Line 5:
LS Brightness; gives the Last Status of the brightness as set by the customer for this selected transmitter. The value can vary from 0 (brightness is minimum) to 63 (brightness is maximum). Brightness values can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the 'MENU' button and selecting 'PICTURE' and 'Brightness'.

Line 6:
LS Contrast; gives the Last Status of the contrast as set by the customer. The value can vary from 0 (contrast is minimum) to 63 (contrast is maximum). Contrast values can be changed via 'cursor left' and 'cursor right' keys on the remote control handset after pressing the 'MENU' button and selecting 'PICTURE' and 'Contrast'.

Line 7:
LS Colour; gives the Last Status of the colour saturation, as set by the customer. The value can vary from 0 (colour is minimum) to 63 (colour is maximum). Colour values can be changed via 'cursor left' and 'cursor right' keys on the remote control handset after pressing the 'MENU' button and selecting 'PICTURE' and 'Colour'.

Line 8:
LS Headphone; gives the Last Status of the headphone volume, as set by the customer. The value can vary from 0 (volume is minimum) to 24 (volume is maximum). Headphone volume values can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the 'MENU' button and selecting 'SOUND' and 'Headphone'.

Line 9:
Sharpness; gives the sharpness value. The value can vary from 0 (sharpness is minimum) to 7 (sharpness is maximum). In case of bad antenna signals a too high value of the sharpness can result in a noisy picture. Sharpness values can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the 'MENU' button and selecting 'PICTURE' and 'Sharpness'.

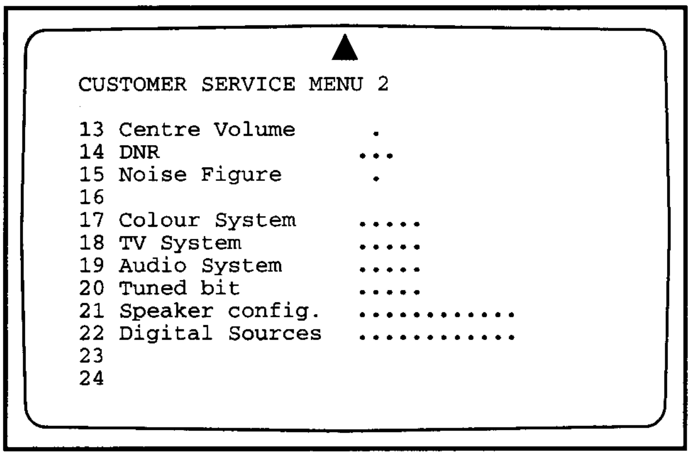
Line 10:
Dolby; indicates whether the received transmitter transmits Dolby sound (present) or not (not present). Attention: The presence of Dolby can only be tested by the software on the Dolby Signalling bit. If a Dolby transmission is therefore received without a Dolby Signalling bit, then this indicator will show 'not present' even though such a Dolby transmission is received.

Line 11:
Surround Mode; indicates the by the customer selected surround mode. In case the set is a Non-Dolby set there will be displayed '0'. If it is a Dolby-set then is displayed: 'Pro Logic', 'Dolby 3 Stereo', 'Hall' or 'Off'. For Dolby-set surround mode can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the 'MENU' button and selecting 'SOUND' and 'Surround settings'.

Line 11a:
Tuner Frequency; indicates the frequency the selected transmitter is tuned to. The tuner frequency can be changed via the “cursor left” and “cursor right” keys for fine tune or by entering directly with the digit keys 0 to 9 on the remote control

handset after opening the installation menu and selecting “manual installation”.
The installation menu can be opened by pressing “timer” and “enlarge” at the same time.

By means of the 'cursor-down' knob on the remote control handset the Customer Service Menu 2 will appear. By means of the 'cursor-up' knob on the remote control handset the Customer Service Menu 1 will appear again.
Customer Service Menu 2 represents following information:



```
                          ▲
CUSTOMER SERVICE MENU 2

13 Centre Volume      .
14 DNR               ...
15 Noise Figure       .
16
17 Colour System     .....
18 TV System         .....
19 Audio System      .....
20 Tuned bit         .....
21 Speaker config.   ............
22 Digital Sources   ............
23
24
```

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Figure 5-2

Line 13:
Centre Volume; gives the volume value of the centre loudspeakers. This value can vary from 0 (minimum volume) to 63 (maximum volume). Centre volume can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the 'MENU' button and selecting 'SOUND', ‘Dolby Pro Logic’ and 'Centre volume'. This feature is only available when surround mode is in 'Dolby Pro Logic' or 'Dolby 3 Stereo'.

Line 14:
DNR; gives the setting of the DNR for the selected transmitter. The following selections are possible:
'off', 'min', 'med' or 'max'. The DNR is changed automatically when 'Active Control' is 'ON'.

Line 15:
Noise Figure; gives the noise ratio for the selected transmitter. This value can vary from 0 (good signal) to 127 (average signal) and to 255 (bad signal).

Line 16:
Digital Option; gives the selected digital mode, '100 Hz' or 'Digital Scan'. Digital option can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset, after pressing the "MENU' button and selecting 'PICTURE', 'Digital Options'.

Line 17:
Colour System; gives information about the colour system of the selected transmitter.

- Black and white: No colour carrier received
- PAL: PAL signal received
- SECAM: SECAM signal received
- NTSC: NTSC signal received

Line 18:
TV System; gives information about the video system of the selected transmitter.

- BG: BG signal received
- DK: DK signal received
- I: PAL I signal received
- L: SECAM L signals received
- M38.9: NTSC M signal received with video carrier on 38.9 MHz
- MN: NTSC M signal received

Line 19:
Audio System; gives information about the audio system of the selected transmitter.

- Sound Muted: No sound
- Dolby Pro Logic: Dolby Pro Logic sound received
- Mono: Mono sound received
- Stereo: Stereo sound received
- Dual I: Language I received
- Dual II: Language II received
- Digital Mono: Digital mono sound is received
- Digital Stereo: Digital stereo sound is received
- Digital Dual I: Digital language I is received
- Digital Dual II: Digital language II is received

Line 20:
Tuned bit; gives information about the tuning method of the stored pre-set. If the value is 'Yes' the pre-set is stored via manual entry of the frequency when a transmitter was not present on that frequency. In that case the TV will attempt to perform a micro-search every time the pre-set number is selected. Once the micro-search has been successful the Tuned Bit will be set to 'No'.

Line 21:
Speaker config.; gives the configuration setting for the speakers. In case the set is a Non-Dolby set there will be displayed '0'. If it is a Dolby-set then is displayed: 'Full internal', 'L/R external', 'Surround external' or 'Full external'. For the Dolby-set the speaker configuration can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after opening the installation menu and selecting 'SETUP'. The installation menu can be opened by pressing 'timer' and 'enlarge' at the same time. This feature is only available when the set has virtual Dolby.

Line 22:
Digital Sources; gives the configuration setting for the digital source. This can be 'FRONT', 'EXT1', 'EXT2' or 'None'. If one of these is selected the starting point is a top quality signal on that input and a number of settings are therefore changed automatically. The digital source can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after opening the installation menu and selecting 'SETUP'. The installation menu can be opened by pressing 'timer' and 'enlarge' at the same time.

## 5.3 Problems and solving tips

Below described problems are all related to TV-settings. The procedures to change the value or the status of the different settings are described in the paragraph ‘Detailed explanation of the Customer Service Mode’.

### 5.3.1 Picture problems

***Worse picture quality in case of DVD pictures***
Check line 22 'Digital sources'. In case line 22 gives the indication 'Not Present' change the setting into 'Present'.

***Snowy/noisy picture***

1. Check line 15 'Noise Figure'. In case the value is 127 or higher and the value is also high on other programs check the aerial cable/aerial system.

2. Check lines 9 'Sharpness' and 15 'Noise Figure'. In case the value of line 9 is 3 or 4 and the value of line 15 is high (127 or higher), lower the value of line 9 'sharpness'.

***Picture too dark***

1. Press 'Smart Picture' button on the Remote Control handset. In case picture improves, raise the brightness value or raise the contrast value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer Service Mode the picture is OK. Raise the brightness value or raise the contrast value. The new value(s) are automatically stored for all TV channels.
3. Check lines 6 'LS Brightness' and 7 'LS Contrast'. The value of line 6 is low (<10) or the value of line 7 is low ((10). Raise the brightness value or raise the contrast value.

***Picture too bright***

1. Press 'Smart Picture' button on the Remote Control handset. In case picture improves, reduce the brightness value or reduce the contrast value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer Service Mode the picture is OK. Reduce the brightness value or reduce the contrast value. The new value(s) are automatically stored for all TV channels.
3. Check lines 6 'LS Brightness' and 7 'LS Contrast'. The value of line 6 is high (>40) or the value of line 7 is high ((50). Reduce the brightness value or raise the contrast value.

***White line around picture elements and text***

1. Press 'Smart Picture' button on the Remote Control. In case picture improves, reduce the sharpness value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer Service Mode the picture is OK. Reduce the sharpness value. The new value(s) are automatically stored for all TV channels.
3. Check line 8 'Sharpness'. Reduce the sharpness value. The new value(s) are automatically stored for all TV channels.

***No picture***

Check line 20 'Tuned bit'. In case the value is 'Yes', install the required program again: open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation.

***Blue picture***

No proper signal is received. Check the aerial cable/aerial system.

***Blue picture and/or unstable picture***

A scrambled or decoded signal is received.

***Black and white picture***

Check line 5 'LS colour'. In case the value is low (( 10) raise the value of colour. The new value(s) are automatically stored for all TV channels.

***No colours/colour lines around picture elements***

1. Check lines 17 'Colour System' and 18 'TV System'. In case line 17 is 'PAL' and line 18 is 'M38.9', the installed system for this pre-set is 'USA', while 'West Europe' is required. Install the required program again: open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; West Europe'.
2. In case line 17 is 'PAL' and line 18 is 'L', the installed system for this pre-set is 'France', while 'West Europe' is required. Install the required program again: open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; West Europe'.

***No colours/noise in picture***

1. Check lines 17 'Colour System' and 18 'TV System'. In case line 17 is 'Black and White' and line 18 is 'BG', the installed system for this pre-set is 'West Europe', while 'USA' is required. Install the required program again: open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; USA'.
2. In case line 17 is 'Black and White' and line 18 is 'L', the installed system for this pre-set is 'France', while 'USA' is required. Install the required program again: open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; USA'

***Colours not correct***

Check lines 17 'Colour System' and 18 'TV System'. In case line 17 is 'PAL' and line 18 is 'L', the installed system for this pre-set is 'France', while 'West Europe' is required. Install the required program again: open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; West Europe'.

***Colours not correct/unstable picture***

Check lines 17 'Colour System' and 18 'TV System'. In case line 17 is 'SECAM' and line 18 is 'BG', the installed system for this pre-set is 'USA', while 'France' is required. Install the required program again: open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; France'.

***Unstable picture***

Check lines 17 'Colour System' and 18 'TV System'. In case line 17 is 'SECAM' and line 18 is 'M 38,9', the installed system for this pre-set is 'West Europe', while 'France' is required. Install the required program again: open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; France'.

***Menu text not sharp enough***

1. Press 'Smart Picture' button on the Remote Control handset. In case picture improves, reduce the contrast value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer Service Mode the picture is OK. Reduce the contrast value. The new value(s) are automatically stored for all TV channels.
3. Check line 7 'LS Contrast'. The value of line 7 is high (>50). Reduce the contrast value.

### 5.3.2 Sound problems

***No sound from left and right speaker***

1. Press 'Smart Sound' button on the Remote Control handset. In case sound improves, raise the volume value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer Service Mode the volume is OK. Raise the volume value. The new value(s) are automatically stored for all TV channels.
3. Check line 4 'LS Volume'. The value is low. Raise the value of 'Volume'. The new value(s) are automatically stored for all TV channels.

***Sound too loud for left and right speaker***

1. Press 'Smart Sound' button on the Remote Control handset. In case sound improves, reduce the volume

value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer Service Mode the volume is OK. Reduce the volume value. The new value(s) are automatically stored for all TV channels.
3. Check line 4 'LS Volume'. The value is high. Reduce the value of 'LS Volume'. The new value(s) are automatically stored for all TV channels.

## 5.4 ComPair

### 5.4.1 Introduction

ComPair (Computer Aided Repair) is a service tool for Philips Consumer Electronics products. ComPair is a further development on the DST service remote control allowing faster and more accurate diagnostics. ComPair has three big advantages:

- ComPair helps you to quickly get an understanding how to repair the EM2E in short time by guiding you step by step through the repair procedures.
- ComPair allows very detailed diagnostics (on $I^2C$ level) and is therefore capable of accurately indicating problem areas. You do not have to know anything about $I^2C$ commands yourself; ComPair takes care of this.
- ComPair speeds up the repair time since it can automatically communicate with the EM2E (when the micro processor is working) and all repair information is directly available. When ComPair is installed together with the SearchMan EM2E electronic manual, schematics and PWB's are only a mouse-click away.

ComPair consists of a Windows based fault finding program and an interface box between PC and the (defective) product. The ComPair interface box is connected to the PC via a serial or RS232 cable. In case of the EM2E chassis, the ComPair interface box and the television communicate with each other via a bi-directional service cable.

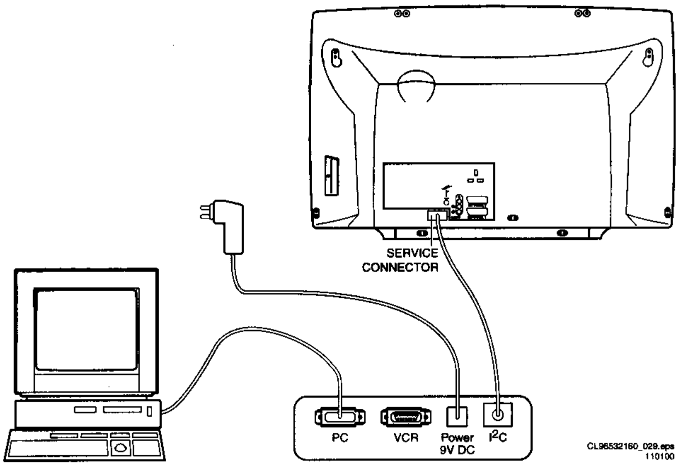

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Figure 5-3

The ComPair fault finding program is able to determine the problem of the defective television. ComPair can gather diagnostic information in 2 ways:

1. Communication to the television (automatic)
2. Asking questions to you (manually)

ComPair combines this information with the repair information in its database to find out how to repair the EM2E.

***Automatic information gathering***
Reading out the error buffer, ComPair can automatically read out the contents of the entire error buffer.
Diagnosis on $I^2C$ level. ComPair can access the $I^2C$ bus of the television without a physical connection. ComPair can send and receive infrared commands to the micro controller of the television. These commands are translated by the controller to $I^2C$ commands and vice versa. In this way it is possible for ComPair to communicate (read and write) to devices on the $I^2C$ busses of the EM2E.

***Manual information gathering***
Automatic diagnosis is only possible if the micro controller of the television is working correctly and only to a certain extend. When this is not the case, ComPair will guide you through the fault finding tree by asking you questions and showing you examples. You can answer by clicking on a link (e.g. text or an oscillogram) that will bring you to the next step in the faultfinding process.

A question could be: Does the screen give a picture? (Click on the correct answer) YES / NO
An example can be: Measure test point I7 and click on the correct oscillogram you see on the oscilloscope

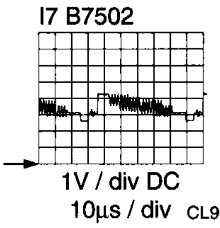

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Figure 5-4

By a combination of automatic diagnostics and an interactive question/answer procedure, ComPair will enable you to find most problems in a fast and effective way.

***Additional features***
Beside fault finding, ComPair provides some additional features like:

- Uploading/downloading of pre-sets
- Managing of pre-set lists
- Emulation of the Dealer Service Tool

### 5.4.2 SearchMan (electronic service manual)

When ComPair is installed in combination with SearchMan, all schematics and PWB's will be directly available while you repair a television if you click on a PWB or schematic link.
Example: Measure the DC voltage on C2568 (PWB/schematic) on the small signal level.
Clicking on PWB will automatically pop-up a picture of the PWB with the location of C2568 marked. Clicking on schematic will automatically pop-up the schematic with the location of C2568 marked.

### 5.4.3 Stepwise Start-up / Shutdown feature of set can be used via ComPair

Under normal circumstances, a fault in the power supply or an error during start-up will switch the television to protection-mode. ComPair can take over the initialisation of the television. In this way it is possible to distinguish which part of the start-up routine (hence which circuitry) is causing the problem.

***Stepwise start-up explanation***
Via ComPair the stepwise start-up can be realised. This is very helpful when a protection is activated (see also chapter 5.6).

| State | Description mode | Display LED (Red) | Activate protection |
|---|---|---|---|
| 0 | Low Power Standby: 5V2/3V3 present, uP in Standby. | On | None |
| 1 | High Power Standby: TV-set in Standby. | Wait 1s, flash 1 time | None |
| 2 | Main Power On: 5V/8V present, HOP in Standby. | Wait 1s, flash 2 times | 4, 5 |
| 3 | HOP On: EHT startup, blackcurrent stabilisation off, picture blanked. | Wait 1s, flash 3 times | Plus 6, 2 & 1 |
| 4 | Initialised. All IC's are initialised, blackcurrent stabilisation is on. | Wait 1s, flash 4 times | Plus rest |
| 5 | TV On: TV-set operates, unblanked picture. | Wait 1s, flash 5 times | |

***Stepwise shutdown explanation***
In the stepwise shutdown mode, state 2 is skipped. (IC's can not be de-initialised).

| State | Description mode | Display LED (Red) | De-activate protect. |
|---|---|---|---|
| 5 | TV On: TV-set operates, unblanked picture. | Wait 1s, flash 5 times | - |
| 4 | Initialised. All IC's stay initialised, blackcurrent stabilisation is on. | Wait 1s, flash 4 times | - |
| 3 | HOP On: EHT startup, blackcurrent stabilisation off, picture blanked. | Wait 1s, flash 3 time | 6, 2, 1 |
| 1 | High Power Standby: TV-set in Standby. | Wait 1s, flash 1 time | 4, 5 |
| 0 | Low Power Standby: 5V2/3V3 present, uP in Standby. | On | |

Note: When set is in stepwise-mode and due to stepping-up a protection is activated, the set really will go into protection (blinking red led). The set will not leave the stepwise-mode however. By stepping up the set can be activated again, until state X, where protection was activated. At state (X-1) diagnostic measurements can be performed.

## 5.5 Error codes

### 5.5.1 Reading error codes from the error buffer

The error buffer can be read in 3 ways:

1. On the screen via the Service Alignment Mode (SAM). In case picture is OK, the error buffer can be read easiest via the SAM. In the main menu of the SAM the last 10 different error codes occurred are displayed. The most recent detected error code is displayed on the left side, so e.g.:
   - 0 0 0 0 0 means no error codes present in the buffer
   - 3 0 0 0 0 means one error code present in the buffer; error code 3
   - 2 3 0 0 0 means two error codes present in the buffer; error code 2 is the most recent, error code 3 is detected before 2.
2. Via the blinking LED procedure. The contents of the error buffer can also be made visible through the “blinking LED” procedure. This is especially useful when there is no picture. There are two methods:
   - When the SDM is entered, the LED will blink the number of times, equal to the value of the last (newest) error code (repeatedly).
   - Via the 'DIAGNOSE' key of the DST. If an error has been detected by the EM2E chassis, the set might go into protection. Without the presence of a picture, the errors can be displayed via the red LED on command of the DST, as long as the main-processor is still active. To display the errors via the red LED by the DST:
     1. Press the 'DIAGNOSE' key (in all modes except the SAM).
     2. Press '1' to view the last error detected (or '2', etc. to show the errors before).
     3. Press the 'OK' key. The blinking Red LED on the TV will now give the requested error.

        Example:
        Error code position 1 - 2 - 3 - 4 - 5
        Error buffer: 12 - 9 - 5 - 0 - 0

        After entering SDM: blink 1x long (750 ms for tens) - pause (1.5 s) - blink 8 x short (250 ms for units) - etc.
        After transmitting 'DIAGNOSE-2-OK' with the DST: blink 9 x short - pause (250 ms) - blink 9 x short - etc.
        After transmitting 'DIAGNOSE-3-OK' with the DST: blink 5 x short - pause (250 ms) - blink 5 x - etc.
        After transmitting 'DIAGNOSE-4-OK' with the DST: nothing happens
3. Via ComPair.

### 5.5.2 Clearing the error buffer

The error buffer can be cleared in 3 ways:

1. In the SAM by selecting the item 'RESET ERROR BUFFER' in the main menu.
2. By the 'DIAGNOSE 99' command of the DST (in all modes except the SAM). Press the DIAGNOSE key on the DST, followed by 9, 9 and then 'OK'.
3. Via ComPair.

Note: When error buffer is full (10 codes), no new error can be stored anymore. However of every error raised is monitored how long it exists in the error buffer. When for any reason a false raised error exists in the buffer, it will be deleted after 50 hours. If this error is still present after 50 hours, it will be raised again. In this way it is safeguarded that the error codes history is stored. Sometimes it is an option to first write down the error buffer content, reset the buffer, and look again which error codes are generated by the set.

### 5.5.3 Error code table

| Error | Device | Description | Defective item | Diagram | Defect. module indication |
|---|---|---|---|---|---|
| 1 | ST24E32 | NVM | 7011 | B5 | Control |
| 2 | H fail protection | HFB | | | Horizontal Flyback |
| 3 | SAA4978 | PICNIC | 7709 | B3 | Feature Box |
| 4 | Supply 5 V | 5V2 | | | +5 V Supply |
| 5 | Supply 8 V | 8V6 | | | +8 V Supply |
| 6 | Slow $I^2C$-bus blocked | | | | Slow $I^2C$ blocked |
| 7 | TDA9330 | HOP video control/geometry | 7301 | B4 | Video Controller |
| 8 | TDA9320 | HIP I/O-video processing | 7323 | B2 | Chroma IF IO |
| 9 | X-ray protection | | | A3 | |
| 11 | HOP protection | | | | |
| 12 | Tuner protection | TUNER_PROT | | | +8 V (Tuner) Supply |
| 13 | UV1316 | Tuner | U1200 | A7 | Tuner |
| 14 | MSP3451/3415 | ITT sound processor + Dolby | 7651 | B6 | Audio Module |
| 15 | Flash protection | | | | |
| 16 | Featurebox protection | FBX_PROT | | | |

Remark:If on the DST the text 'ERROR 2' is displayed, this means that the communication from the TV to the DST has failed.

## 5.6 Protections

### 5.6.1 General

The EM2E has only one micro-processor (OTC) which remains active during Standby. This because power of the microprocessor and the attached memory chip set is coming from the 3V3 supply, which is derived from the 5V Standby-circuitry. So in both Power-on as in Standby-mode the microprocessor is connected to this power supply.

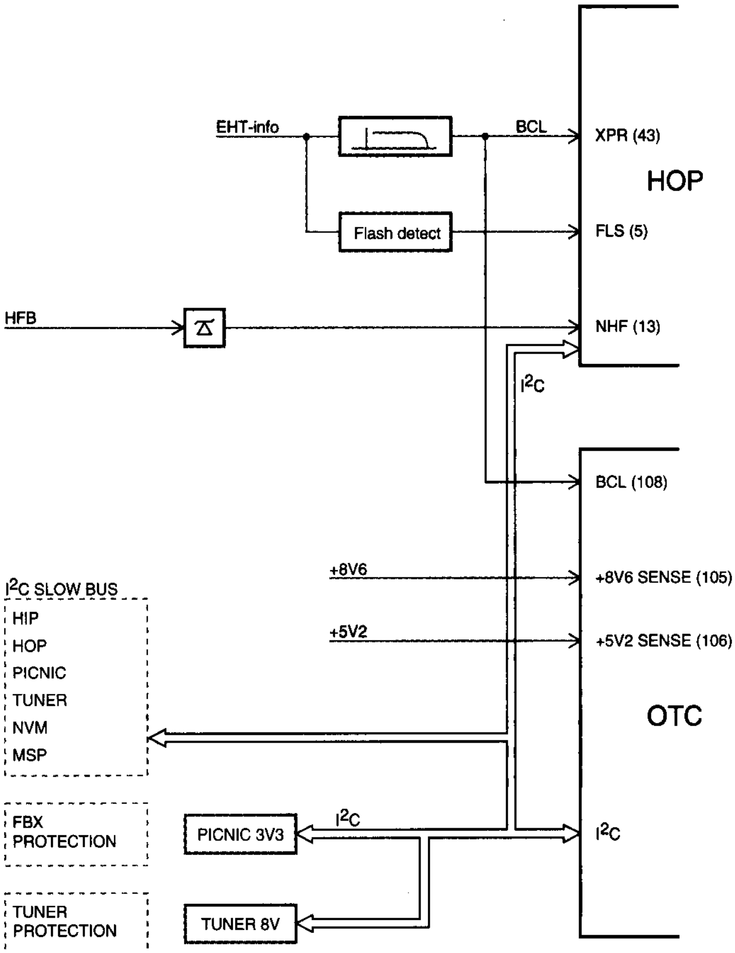
If a fault situation is detected an error code will be generated and if necessary the set will be put in the protection-mode. The protection-mode is indicated by blinking of the red LED at a frequency of 3 Hz. In some error cases the micro processor does not put the set in the protection-mode. The error codes of the error buffer can be read via the service-menu (SAM), the blinking LED procedure or via DST/ComPair. The DST diagnose functionality will force the set into the Service-standby, which is alike the usual Standby, however the micro-processor has to remain in normal operation completely.

To get a quick diagnosis the EM2E has 3 service-modes implemented:

- The Customer Service Mode (CSM).
- The Service Default Mode (SDM). Start-up of the set in a predefined way.
- The Service Alignment Mode (SAM). In this mode items of the set can be adjusted via a menu and with the help of test patterns.

Both SDM & SAM modes can be entered via the 'service pads' on the SSB, via a RC (DST or standard RC) or via ComPair. The SAM can not be entered in Standby, the set has to be in normal operation.

The EM2E 'Protection Diagram' shows the structure of the protection system. See diagram below.



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210100

Figure 5-5

There are several types of protections:

- $I^2C$ related protections
- OTC related protections (via polling on I/O pins or via algorithms).
- HOP related protections (mainly for deflection items).
- Hardware errors which are not sensed by the OTC (e.g. BRIDGE_PROT)

***$I^2C$ related protections***

In normal operation some registers of the $I^2C$ controlled IC's will be refreshed every 200 msec. During this sequence the $I^2C$-busses and the $I^2C$ -IC's as well will be checked. The $I^2C$

protection will take place if the SDA and SCL are whether short circuited to ground or to each other. An $I^2C$ error can also occur, if the power supply of the IC is missing (e.g. TUNER_PROT (error 12) & FBX_PROT (error 16)).

***OTC related protections***

If a protection is detected at an input of the OTC, all protection inputs of the OTC will be scanned every 200 msec. for 5 times. If the protection on one of the inputs is still activated after 1 sec., then the set will be put in the protection-mode. Before the scanning is started a so-called ESD-refresh will be carried out first, because the interrupt on one of the inputs may be caused either by a FLASH or by ESD. As a FLASH or ESD can harm the settings of some IC's, the HOP-HIP-MSP-PICNIC-NVM and Tuner are initialised again to ensure the normal picture and sound conditions of the set.

- 8.6 V and 5.2 V protection. The presence of the 8.6 V and 5.2 V is sensed by the OTC. If these voltages are not present, then an error code is stored in the error buffer of the NVM, and the set is put in the protection-mode.

***HOP related protections***

Every 200 msec. the status register of the HOP is read by the OTC via $I^2C$. If a protection signal is detected on one of the inputs of the HOP, then the relevant error bit in the HOP register is set to 'high'. If the error bit is still 'high' after 1 sec., the OTC will store the error code in the error buffer (NVM) and depending on the relevancy of the error bit the set will either go into the protection-mode or not.

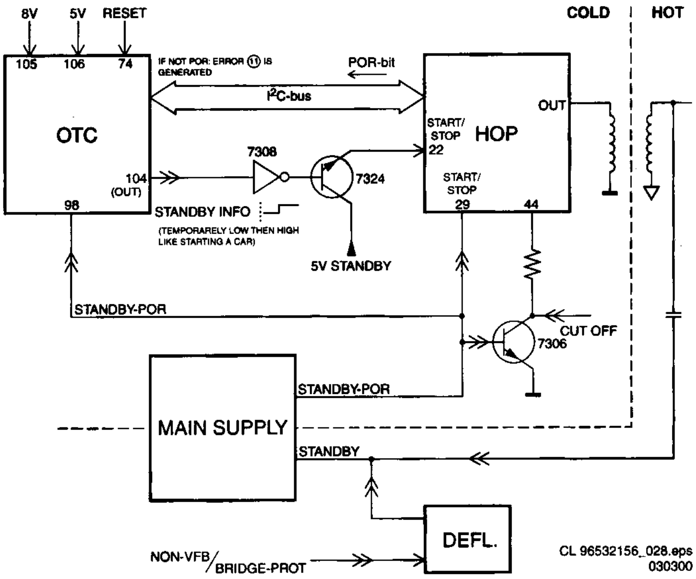
- HFB: Horizontal Flyback. If the horizontal flyback is not present, then this is detected via the HOP (HFB_X-RAY_PROT). One status bit is set to 'high'. The error code is stored in the error buffer and the set will go into the protection mode
- Flash detection. From the EHT-info, via D6303 and T7303 a flash will stop the H-drive and line output stage immediately. The FLS-bit in the status register of the HOP is set to 'high'. As the duration of a flash is very short the FLS-bit will be reset to 'low' again after the flash refresh, so via a slow start the set will be started again.

***Hardware related protections***

Due to the architecture (with 'hot' deflection) there are two protections that are 'unknown' to the microprocessor, namely the 'BRIDGE_PROT' from the line-stage and the 'NO_VFB' protection form the frame-stage. If one of these protections is triggered, the set is positioned in 'Standby'-mode. The OTC will now try to re-start the set. If this will not succeed after 5 times (after ≈ 1 minute), the OTC will generate error 15 (Flash protection) and will start the blinking red LED.

## 5.7 Repair tips

### 5.7.1 General



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030300

Figure 5-6

The start-up of the set is very different as of other sets:

1. When the set is switched 'ON', first the HOP is placed in 'low power start-up' mode (HOP-standby-mode). This means that 5 V (derived from available Standby-supply) is connected to pin 22 of the HOP-IC.
2. Now the HOP is driving the line-circuitry with 50 kHz pulses. At the base of the line-transistor this is sensed via the 'STANDBY'-line.
3. This signal triggers the Main supply to operate. Now the line-stage has 'BAT'-voltage (141 V), it will also start.
4. After the 5 and 8 V-supply lines are sensed by the OTC, it will read the POR-bit from the HOP via the I$^2$C-bus.
5. Now the HOP is switched in 'ON'-mode and the set will start-up further with normal drive (31.25 kHz for PAL).
6. The last step will be the unblanking of the picture.

SO STANDBY IS NOT CONTROLLED VIA A STANDBY-LINE FROM MICROPROCESSOR, BUT IS ACHIEVED INDIRECTLY VIA THE HOP-CIRCUITRY.

Notice that a very big part of the set (Large Signal Panel) is 'hot', meaning the primary part of the Standby supply, the whole Main supply (except for the secondary Audio supply) and the complete deflection circuit. SO NOTICE THAT THE DEFLECTION-COIL IS HOT!

This set does not have an IR transmitting-LED anymore. In its place, a Service (ComPair) connector is implemented at the rear of the set, which is directly accessible. In addition to this, there is a blinking LED procedure to show the contents of the error buffer.

The relay you hear during switching 'ON' (via the main switch) is from the degaussing-circuitry. So it is not used for switching the supply as in the MG-chassis.

When using ComPair (connect cable to ComPair-connector at the rear of the set, placed behind a separate cover), there exists the possibility to have a stepwise start-up procedure. With this mode one can startup the set step-by-step. This also means that in certain steps some protections will not be activated. This can sometimes be convenient during repair. See table in 5.4.3, which is describing the stepwise start-up mode with belonging LED behaviour.

On the SSB there are 'service pads' implemented to activate (via bridging) the SDM- or SAM-mode (see chapter 4). When the SDM-mode is activated, the processor-controlled protections (so not the Hardware and HOP-protections) can be overruled. This means that the ADC-input protections (5- and 8 V) and the I$^2$C not-acknowledging info from Tuner and FBX can be overruled.
WHEN DOING SO THE SERVICE-ENGINEER MUST KNOW WHAT HE IS DOING, AS IT COULD LEAD TO DAMAGING THE SET.

***'Repair-tips how to repair the Main power supply:***

- Simplest way is to replace components of the Main supply with repair kit (3122 785 90100)
- More detailed way:
  - Replace FET 7504 and zener 6505
  - Remove SSB-panel
  - Short-circuit BE of TS7529 in order to put supply in 'on'-mode (TS7529 is blocking then)
  - Load capacitor C2515 ($V_{BAT}$) with a load of 500 ohm. Supply can not work without a minimum load.
  - Use a variac to slowly increase the $V_{MAINS}$. Measure over sensing-resistors R3514/15 whether a nice sawtooth-voltage becomes available. Also measure the $V_{BAT}$-output
  - $V_{BAT}$ may never exceed 141 V. If so there is something wrong in the feedback-circuitry (e.g. regulator 7506)

***Repair-tips how to repair the Standby power supply:***

- Simplest way is to replace components of the Standby supply with repair kit (3122 785 90110)

***Repair-tips how to repair the Deflection-circuitry:***

- Simplest way is to replace components of the Deflection-circuitry with repair kit (3122 785 90120)

***Service-tips:***

- Be careful measuring on gate of FET 7504. Circuitry is very high ohmic and can easily be damaged.
- Take care not to touch 'hot' heatsink while disconnecting SSB, despite the fact that mains cord is out of mains socket. There still is an annoying rest-voltage for a short while.
- Do not try to measure on side of SSB directed to the hot heatsink. This is dangerous. All service test points are guided to the Tuner side and are pointed out by service printing. Where the circuitry was too crowded to place this service-printing it has been explained on the Test point overviews in this manual

### 5.7.2 Repair tips

| Phenomenon | Possible Cause | Repair-tip |
|---|---|---|
| No picture, no LED. | Standby Supply defective. | Measure circuitry (see diagram A2). Start at testpoint P16.<br>Regardless the mode of the set, this voltage should always be available. |
| No picture, red LED (high intensity) despite expectation the set should be 'on' (this looks like Standby). | There are 2 protections that are not 'seen' by processor, that force set in 'Standby'-mode, namely 'NO-VFB-prot' (= no frame-deflection), or 'BRIDGE_PROT' (safety error). | If protection is activated by 'NO_VFB-prot', this can be measured with a scope on service test point F10 (diagram A4). Before this protection is activated, a few seconds a horizontal white line is visible.<br>The 'BRIDGE_PROT' error may never occur. Is implemented due to legal requirements. Flash protection error (15) will be generated in both cases after 5 restart attempts. Visible via blinking LED procedure. NO_VFB-prot can be determinated by white line. |
| No picture, red LED blinking (3 Hz). | Set is in protection due to various causes. For error codes see error-code list. | You have no picture, so:<br>- or you read out error buffer via ComPair<br>- or you read out blinking LED information via 'diagnose' x dealer remote<br>- or you read out blinking LED sequence via <default>-button dealer remote<br>- or you read out blinking LED sequence via service default mode entered via RC-command 062596 + 'menu'<br>When error is known, check circuitry related to supply-voltage and I$^2$C-communication. |
| No picture, red LED blinking code 6,6,6 or 1,1,1 | No communication on I$^2$C-bus or NVM-I$^2$C-bus to processor. Set is in protection-mode | As processor cannot communicate with one of the 2 busses it spontaneously starts blinking. Measure dependent of the error on the I$^2$C-bus which device is loading the bus.<br>This protection can be overruled via SDM-entry on SSB or via stepwise start-up mode step 'MainPowerOn'. |
| No picture, no sound, set is making audible squeaking sound | Supply could be in hiccup-mode which can be heard via supply-transformer squeaking | This could be caused by:<br>- Short-circuited V$_{BAT}$ (caused by short circuited line transistor 7421) or<br>- Short-circuited sound-winding (amplifier is short-circuiting 28 V) or<br>- Short-circuited D6514 (due to a too high V$_{BAT}$).<br>Delete excessive load to see where failure is caused by or check feed back circuit. See repair-tip main power supply (supply needs a minimal load). |
| No picture, no sound, LED works fine | Supply does not work correctly | If e.g. V$_{BAT}$ is only about 90 V, regulator-IC 7506 could be damaged. |
| No RC5-reception. Red LED does not echo RC-commands. | Processor-circuitry or RC-receiver is wrong. | In case set reacts on local keyboard operation, error must be found in the IR-receiver circuitry (diagram E). |
| Relay-activation (degaussing) not audible when switch set 'on' from 'off'. | Processor not working correctly. | Check RESET-circuitry on diagram B5. When switching on the set all i/o-pins of processor should become high for a moment, so also the degauss-input signal. |
| No sound, but picture. | Measure P7 on diagram A1. Possible sound-amplifier is broken (but not short-circuited), or sound-enable line is high (see diagram A5).<br>Further the audio-signal path must be measured (HIP, MSP, switch-IC's, amplifier). | Measure and repair. With ComPair there is a beep-test that can determine where the signal stops (use loudspeakers, headphone). |
| No sound at headphone output. | Discrete amplifiers or supply to it could be damaged. | Measure A12, A13, A14, A15 and supply-line on diagram A6. |
| Picture is rotated. | Rotation-circuitry or supply to it could be damaged. | Measure test points F3, R1, R2 on diagram A4. |
| No picture. | Check functionality and cabling Tuner to SSB. | Notice cable 0946. |
| Picture looks like cushion, further O.K. | Or NVM-content is overwritten or E/W-MOSFET is short-circuited | First check in Service Alignment Mode, whether geometry can be restored. If not check testpoint L4 and diagram A3, or measure with an ohm-meter whether TS7480 is defective. |
| Very white picture, with flyback lines visible | 180 V is missing on CRT-panel | Probably R3468 on LSP (diagram A3) is interrupted, or bad connection plug 0324 to 0224 (CRT-panel). |
| Un-sharp picture | Focus could be mis-aligned or SCAVEM-circuitry does not work correctly | Align focus-potmeter of Line Transformer; check SCAVEM-circuitry on CRT-panel [F]. |
| Un-synced picture | Sync is derived in HIP-IC from X-tals 1305 and/or 1308 | Maybe a X-tal is making bad contact. |
| Picture distorted. | Check video-path, service default mode. | Investigate whether there exist an error code in the error buffer.<br>In case there is an error code, check I$^2$C-bus and/or supply-lines (see overview supply-lines).<br>Measure and check signal path Tuner, HIP, PICNIC, HOP, RGB-amplifier.<br>In case it is a geometry-issue, check Frame-circuitry, alignments or possible corrupted NVM (7011) |
| No menu, OSD. | Probably processor is defective. | Measure test points C7, C8, C9, C10 on diagram B5. |

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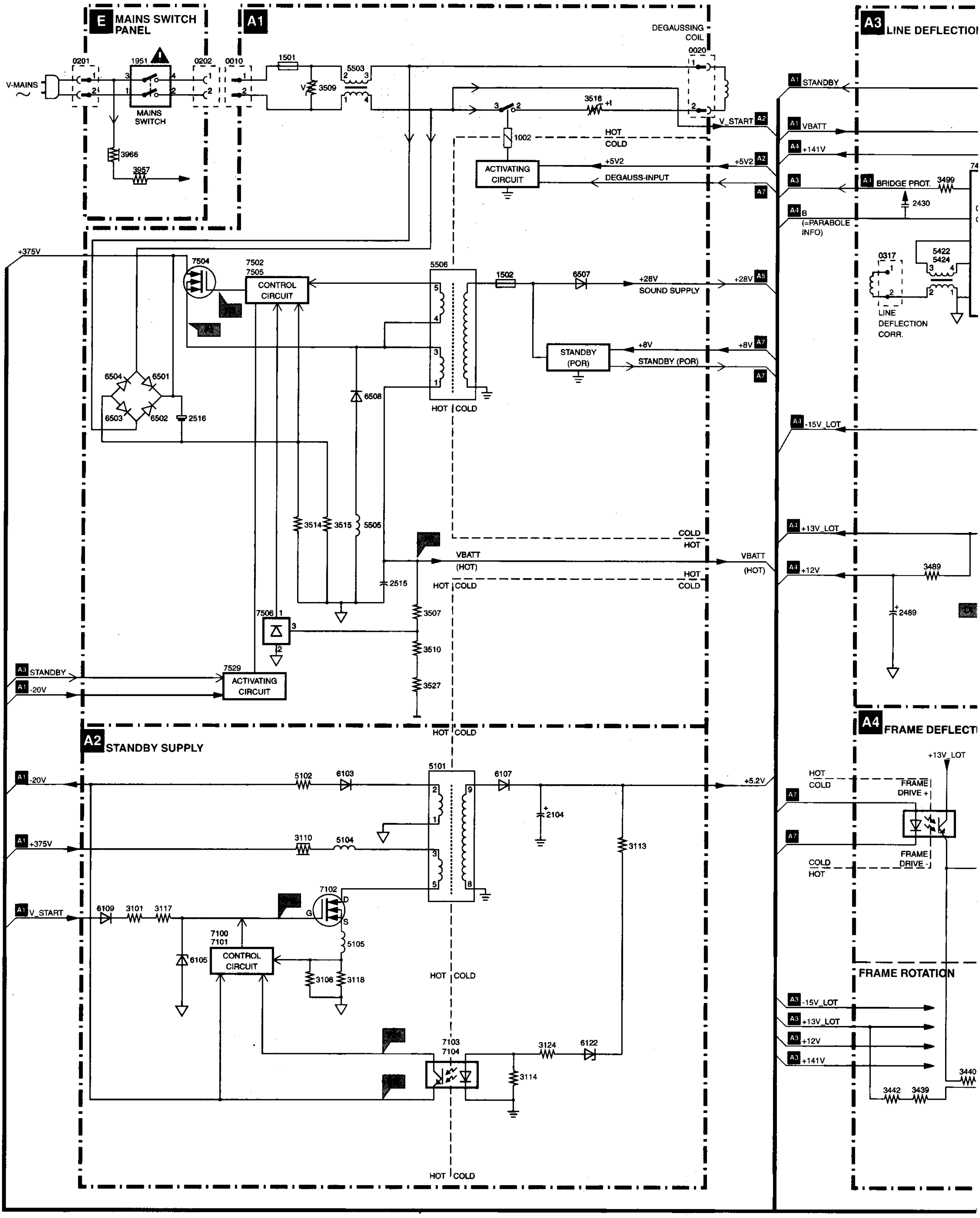
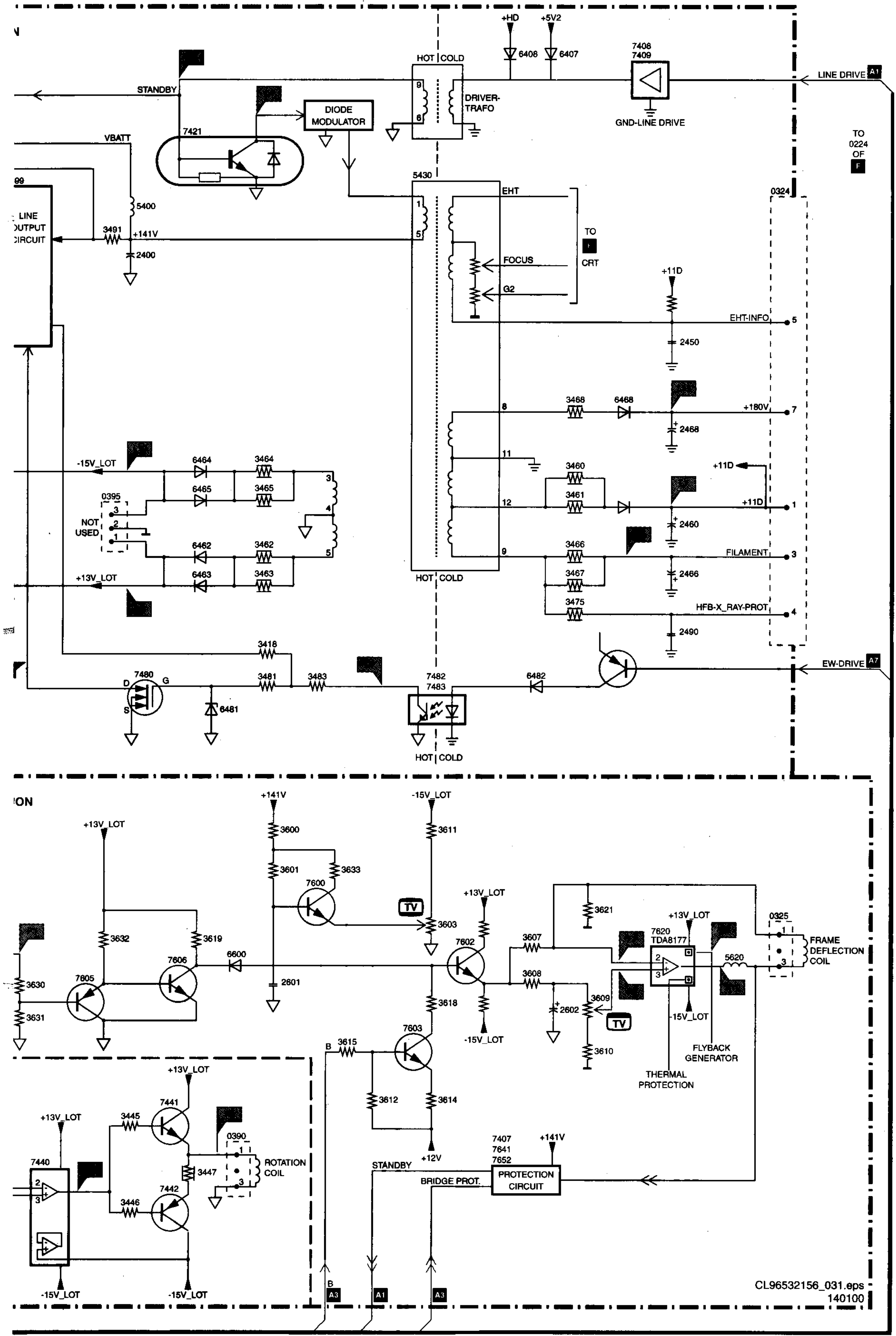
090200

# 6. Wiring diagram, blockdiagram, supply diagram and testpoints

## Blockdiagram


E MAINS SWITCH PANEL
A1
DEGAUSSING COIL
A3 LINE DEFLECTION
V-MAINS
0201
1951
0202
0010
MAINS SWITCH
3966
3957
1501
5503
3509
0020
3516
V_START A2
1002
HOT
COLD
ACTIVATING CIRCUIT
+5V2
+5V2 A2
DEGAUSS-INPUT
A7
+375V
7504
7502
7505
CONTROL CIRCUIT
5506
1502
6507
+28V
SOUND SUPPLY
+28V A5
STANDBY (POR)
+8V
+8V A7
STANDBY (POR)
6504
6501
6503
6502
2516
6508
HOT COLD
3514
3515
5505
VBATT (HOT)
2515
3507
7506
3510
3527
A3 STANDBY
A1 -20V
7529
ACTIVATING CIRCUIT
A2 STANDBY SUPPLY
A1 -20V
5102
6103
5101
6107
+5.2V
2104
A1 +375V
3110
5104
3113
A1 V_START
6109
3101
3117
7102
G D S
5105
7100
7101
CONTROL CIRCUIT
6105
3108
3118
7103
7104
3124
6122
3114
A1 STANDBY
A1 VBATT
A4 +141V
A3
A1 BRIDGE PROT.
3499
2430
A4 B (=PARABOLE INFO)
0317
5422
5424
LINE DEFLECTION CORR.
A4 -15V_LOT
A4 +13V_LOT
A4 +12V
3489
2489
A4 FRAME DEFLECTI
+13V_LOT
FRAME DRIVE +
FRAME DRIVE -
FRAME ROTATION
A3 -15V_LOT
A3 +13V_LOT
A3 +12V
A3 +141V
3440
3442
3439



STANDBY
VBATT
7421
DIODE MODULATOR
HOT | COLD
DRIVER-TRAFO
+HD
+5V2
6408
6407
7408
7409
LINE DRIVE A1
GND-LINE DRIVE
TO 0224 OF F
LINE OUTPUT CIRCUIT
5400
3491
+141V
2400
5430
EHT
FOCUS
G2
TO F CRT
0324
+11D
EHT-INFO
2450
3468
6468
+180V
2468
-15V_LOT
6464
3464
6465
3465
0395
NOT USED
6462
3462
+13V_LOT
6463
3463
3460
3461
+11D
2460
3466
FILAMENT
3467
2466
3475
HFB-X_RAY-PROT
2490
3418
7480
D
G
S
3481
3483
6481
7482
7483
6482
EW-DRIVE A7
HOT | COLD
+141V
-15V_LOT
3600
3611
+13V_LOT
3601
3633
7600
TV
3603
3632
3619
7606
6600
2601
7602
3607
3621
7620
TDA8177
0325
FRAME DEFLECTION COIL
5620
3630
7605
3631
3608
2602
3609
-15V_LOT
3618
3610
7603
3615
B
FLYBACK GENERATOR
THERMAL PROTECTION
3612
3614
+12V
7407
7641
7652
PROTECTION CIRCUIT
STANDBY
BRIDGE PROT.
7441
3445
0390
ROTATION COIL
3447
7440
7442
3446
-15V_LOT
A3
A1
A3
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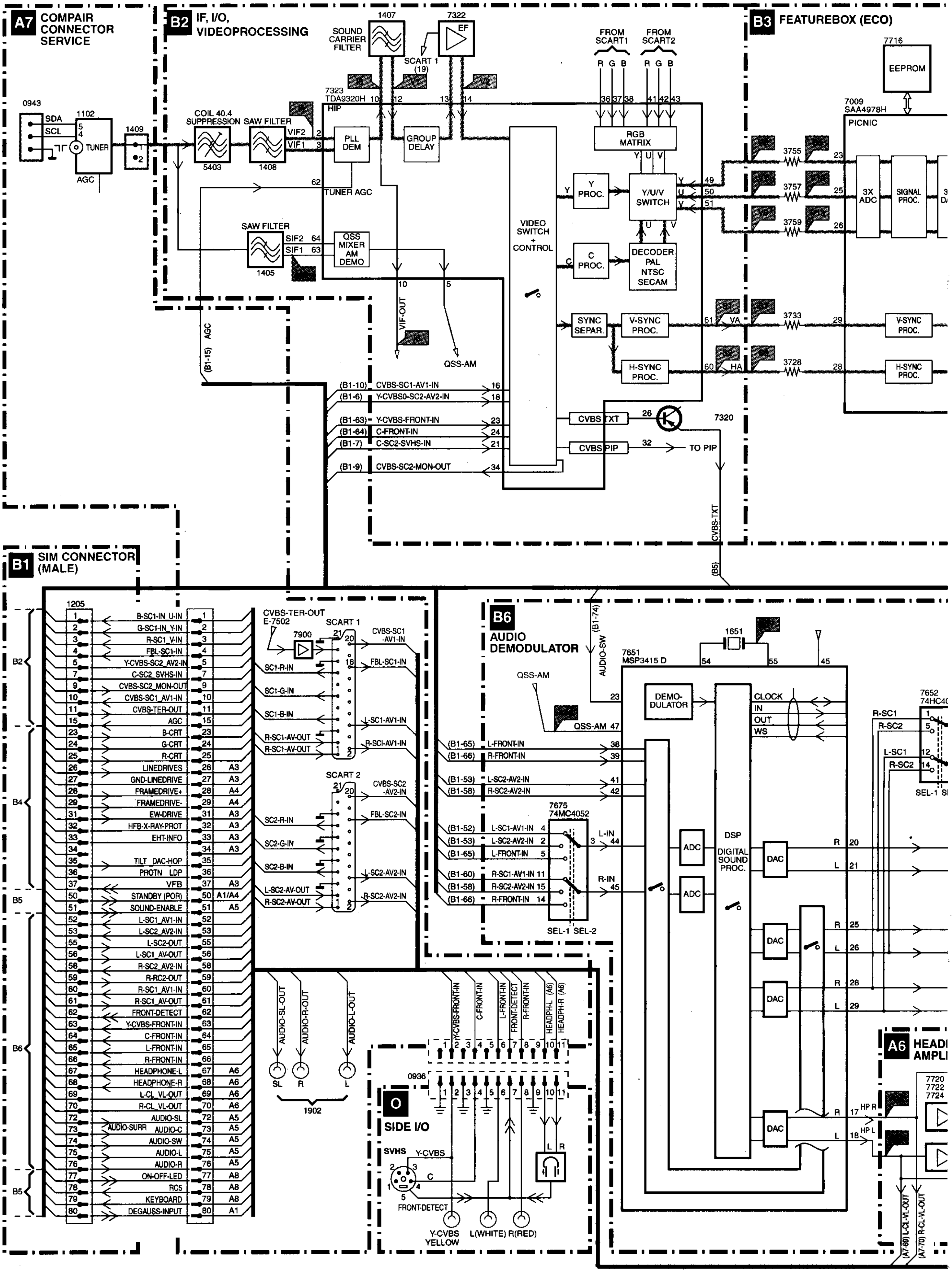
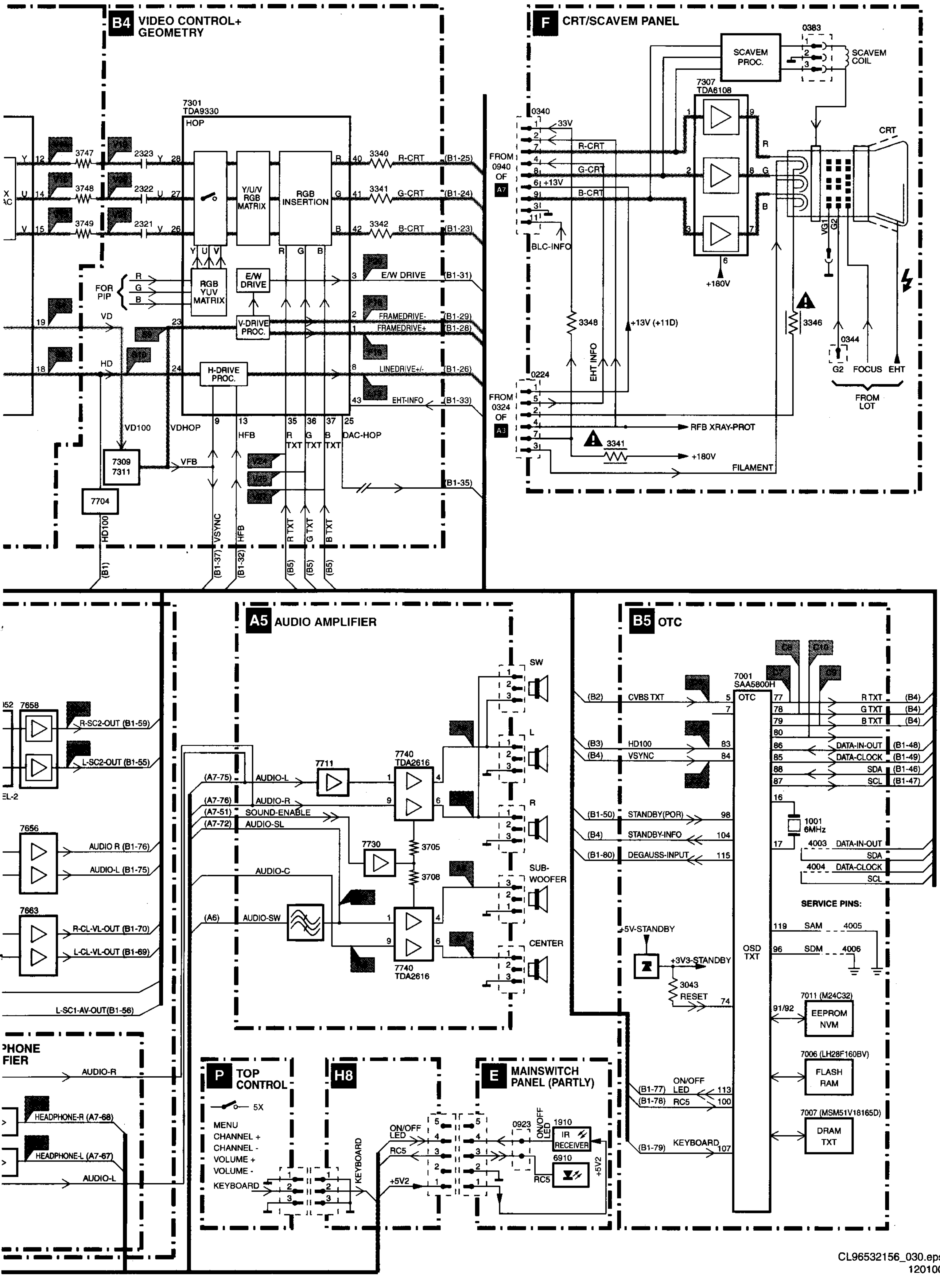
140100

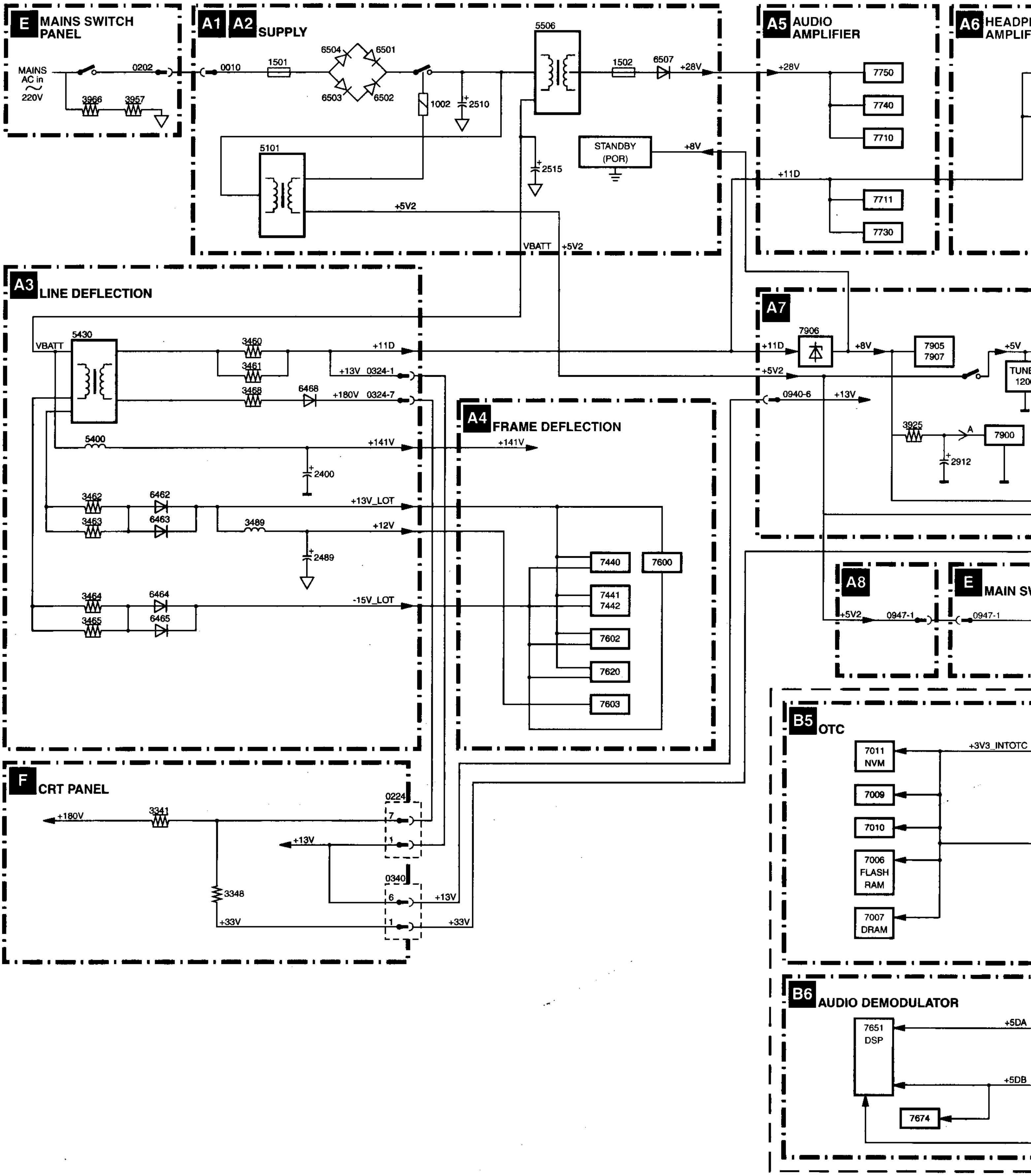
# Blockdiagram

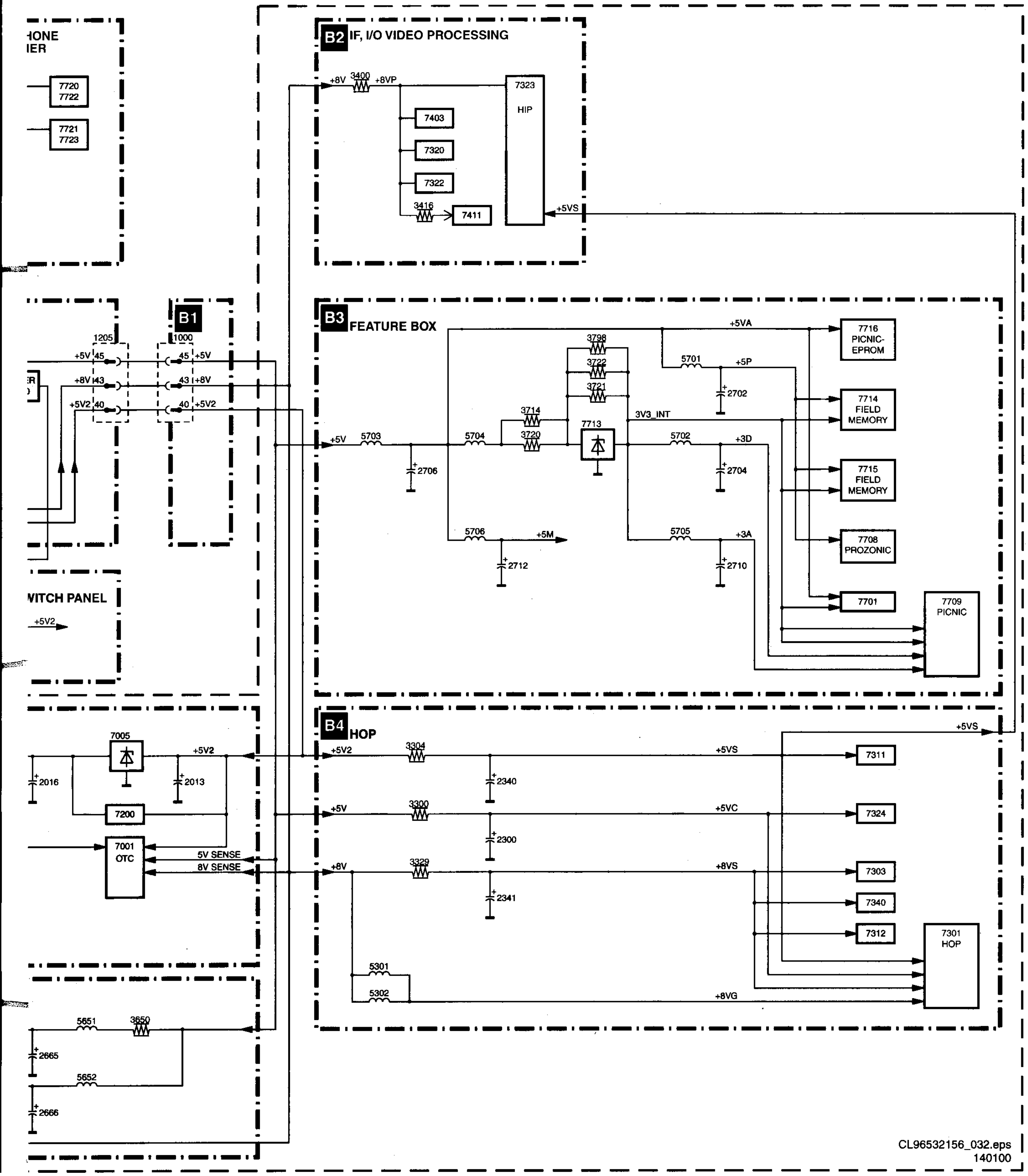

A7 COMPAIR CONNECTOR SERVICE
0943
SDA
SCL
1102
TUNER
AGC
1409
B2 IF, I/O, VIDEOPROCESSING
COIL 40.4 SUPPRESSION
5403
SAW FILTER
1408
VIF2
VIF1
SOUND CARRIER FILTER
1407
7322
EF
SCART 1 (19)
7323 TDA9320H
HIP
PLL DEM
GROUP DELAY
TUNER AGC
SAW FILTER
1405
SIF2
SIF1
QSS MIXER AM DEMO
VIF-OUT
QSS-AM
(B1-15) AGC
VIDEO SWITCH + CONTROL
FROM SCART1
FROM SCART2
R G B
RGB MATRIX
Y PROC.
C PROC.
Y/U/V SWITCH
DECODER PAL NTSC SECAM
SYNC SEPAR.
V-SYNC PROC.
H-SYNC PROC.
(B1-10) CVBS-SC1-AV1-IN
(B1-6) Y-CVBS0-SC2-AV2-IN
(B1-63) Y-CVBS-FRONT-IN
(B1-64) C-FRONT-IN
(B1-7) C-SC2-SVHS-IN
(B1-9) CVBS-SC2-MON-OUT
CVBS TXT
CVBS PIP
7320
TO PIP
CVBS-TXT
(B5)
B3 FEATUREBOX (ECO)
7716
EEPROM
7009 SAA4978H
PICNIC
3755
3757
3759
3X ADC
SIGNAL PROC.
3733
3728
V-SYNC PROC.
H-SYNC PROC.
VA
HA
B1 SIM CONNECTOR (MALE)
1205
B2
B4
B5
B6
B-SC1-IN_U-IN
G-SC1-IN_Y-IN
R-SC1_V-IN
FBL-SC1-IN
Y-CVBS-SC2_AV2-IN
C-SC2_SVHS-IN
CVBS-SC2_MON-OUT
CVBS-SC1_AV1-IN
CVBS-TER-OUT
AGC
B-CRT
G-CRT
R-CRT
LINEDRIVES
GND-LINEDRIVE
FRAMEDRIVE+
FRAMEDRIVE-
EW-DRIVE
HFB-X-RAY-PROT
EHT-INFO
TILT_DAC-HOP
PROTN_LDP
VFB
STANDBY (POR)
SOUND-ENABLE
L-SC1_AV1-IN
L-SC2_AV2-IN
L-SC2-OUT
L-SC1_AV-OUT
R-SC2_AV2-IN
R-RC2-OUT
R-SC1_AV1-IN
R-SC1_AV-OUT
FRONT-DETECT
Y-CVBS-FRONT-IN
C-FRONT-IN
L-FRONT-IN
R-FRONT-IN
HEADPHONE-L
HEADPHONE-R
L-CL_VL-OUT
R-CL_VL-OUT
AUDIO-SL
AUDIO-SURR
AUDIO-C
AUDIO-SW
AUDIO-L
AUDIO-R
ON-OFF-LED
RC5
KEYBOARD
DEGAUSS-INPUT
A3
A4
A1/A4
A5
A6
A8
A1
CVBS-TER-OUT E-7502
7900
SCART 1
CVBS-SC1 -AV1-IN
FBL-SC1-IN
SC1-R-IN
SC1-G-IN
SC1-B-IN
L-SC1-AV1-IN
R-SC1-AV-OUT
R-SC1-AV1-IN
SCART 2
CVBS-SC2 -AV2-IN
FBL-SC2-IN
SC2-R-IN
SC2-G-IN
SC2-B-IN
L-SC2-AV2-IN
L-SC2-AV-OUT
R-SC2-AV-OUT
R-SC2-AV2-IN
AUDIO-SL-OUT
AUDIO-R-OUT
AUDIO-L-OUT
SL
R
L
1902
B6 AUDIO DEMODULATOR
(B1-74) AUDIO-SW
QSS-AM
1651
7651 MSP3415 D
DEMO-DULATOR
CLOCK
IN
OUT
WS
(B1-65) L-FRONT-IN
(B1-66) R-FRONT-IN
(B1-53) L-SC2-AV2-IN
(B1-58) R-SC2-AV2-IN
7675 74MC4052
(B1-52) L-SC1-AV1-IN
(B1-53) L-SC2-AV2-IN
(B1-65) L-FRONT-IN
(B1-60) R-SC1-AV1-IN
(B1-58) R-SC2-AV2-IN
(B1-66) R-FRONT-IN
L-IN
R-IN
SEL-1 SEL-2
ADC
DSP
DIGITAL SOUND PROC.
DAC
7652 74HC4
R-SC1
R-SC2
L-SC1
L-SC2
SEL-1
A6 HEAD AMPL
7720 7722 7724
HP R
HP L
(A7-69) L-CL-VL-OUT
(A7-70) R-CL-VL-OUT
Y-CVBS-FRONT-IN
C-FRONT-IN
L-FRONT-IN
FRONT-DETECT
R-FRONT-IN
HEADPH-L (A6)
HEADPH-R (A6)
0936
O SIDE I/O
SVHS
Y-CVBS
C
FRONT-DETECT
Y-CVBS YELLOW
L(WHITE)
R(RED)


B4 VIDEO CONTROL+ GEOMETRY
7301 TDA9330
HOP
Y/U/V RGB MATRIX
RGB INSERTION
RGB YUV MATRIX
E/W DRIVE
V-DRIVE PROC.
H-DRIVE PROC.
FOR PIP
VD
HD
VD100
VDHOP
VFB
7309 7311
7704
HD100
3747
3748
3749
2323
2322
2321
3340 R-CRT (B1-25)
3341 G-CRT (B1-24)
3342 B-CRT (B1-23)
E/W DRIVE (B1-31)
FRAMEDRIVE- (B1-29)
FRAMEDRIVE+ (B1-28)
LINEDRIVE+/- (B1-26)
EHT-INFO (B1-33)
(B1-35)
HFB
R TXT
G TXT
B TXT
DAC-HOP
VSYNC
(B1)
(B1-37)
(B1-32)
(B5)
F CRT/SCAVEM PANEL
SCAVEM PROC.
0383
SCAVEM COIL
7307 TDA6108
+180V
CRT
FROM 0940 OF A7
0340
33V
+13V
BLC-INFO
3348
EHT INFO
+13V (+11D)
3346
0344
G2
FOCUS
EHT
FROM LOT
VG1
FROM 0324 OF A3
0224
3341
RFB XRAY-PROT
+180V
FILAMENT
A5 AUDIO AMPLIFIER
7658
R-SC2-OUT (B1-59)
L-SC2-OUT (B1-55)
7656
AUDIO R (B1-76)
AUDIO-L (B1-75)
7663
R-CL-VL-OUT (B1-70)
L-CL-VL-OUT (B1-69)
L-SC1-AV-OUT(B1-56)
(A7-75) AUDIO-L
(A7-76) AUDIO-R
(A7-51) SOUND-ENABLE
(A7-72) AUDIO-SL
AUDIO-C
(A6) AUDIO-SW
7711
7740 TDA2616
7730
3705
3708
SW
L
R
SUB-WOOFER
CENTER
PHONE FIER
AUDIO-R
HEADPHONE-R (A7-68)
HEADPHONE-L (A7-67)
AUDIO-L
P TOP CONTROL
5X
MENU
CHANNEL +
CHANNEL -
VOLUME +
VOLUME -
KEYBOARD
H8
E MAINSWITCH PANEL (PARTLY)
ON/OFF LED
RC5
+5V2
0923
1910
IR RECEIVER
6910
B5 OTC
7001 SAA5800H
OTC
OSD TXT
(B2) CVBS TXT
(B3) HD100
(B4) VSYNC
R TXT (B4)
G TXT (B4)
B TXT (B4)
DATA-IN-OUT (B1-48)
DATA-CLOCK (B1-49)
SDA (B1-46)
SCL (B1-47)
1001 6MHz
4003 DATA-IN-OUT
SDA
4004 DATA-CLOCK
SCL
(B1-50) STANDBY(POR)
(B4) STANDBY-INFO
(B1-80) DEGAUSS-INPUT
SERVICE PINS:
SAM 4005
SDM 4006
+5V-STANDBY
+3V3-STANDBY
3043 RESET
7011 (M24C32) EEPROM NVM
7006 (LH28F160BV) FLASH RAM
7007 (MSM51V18165D) DRAM TXT
(B1-77) ON/OFF LED
(B1-78) RC5
(B1-79) KEYBOARD

CL96532156_030.eps
120100

## Supply lines overview

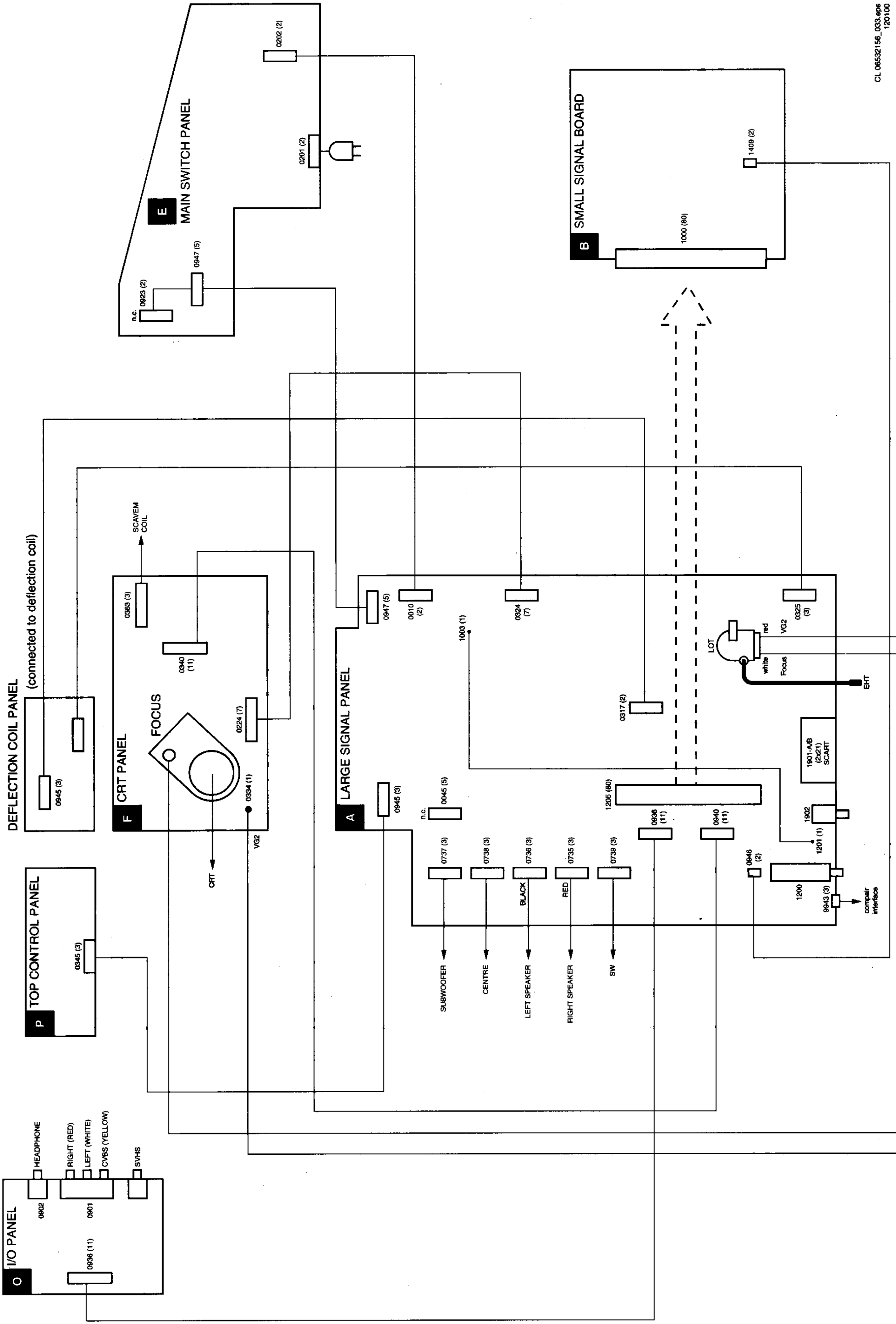

E MAINS SWITCH PANEL
MAINS AC in ~ 220V
3966
3957
0202
A1 A2 SUPPLY
0010
1501
6504
6501
6503
6502
1002
2510
5506
1502
6507
+28V
5101
2515
STANDBY (POR)
+8V
+5V2
VBATT
+5V2
A5 AUDIO AMPLIFIER
+28V
7750
7740
7710
+11D
7711
7730
A6 HEADP AMPLIF
A3 LINE DEFLECTION
VBATT
5430
3460
3461
+11D
+13V 0324-1
3468
6468
+180V 0324-7
5400
+141V
2400
3462
6462
3463
6463
+13V_LOT
3489
+12V
2489
3464
6464
3465
6465
-15V_LOT
A4 FRAME DEFLECTION
+141V
7440
7600
7441 7442
7602
7620
7603
A7
7906
+11D
+8V
7905 7907
+5V
+5V2
TUNE 120
0940-6
+13V
3925
A
7900
2912
A8
+5V2
0947-1
E MAIN S
0947-1
F CRT PANEL
+180V
3341
0224
7
1
+13V
3348
0340
6
+13V
+33V
1
+33V
B5 OTC
7011 NVM
+3V3_INTOTC
7009
7010
7006 FLASH RAM
7007 DRAM
B6 AUDIO DEMODULATOR
7651 DSP
+5DA
+5DB
7674



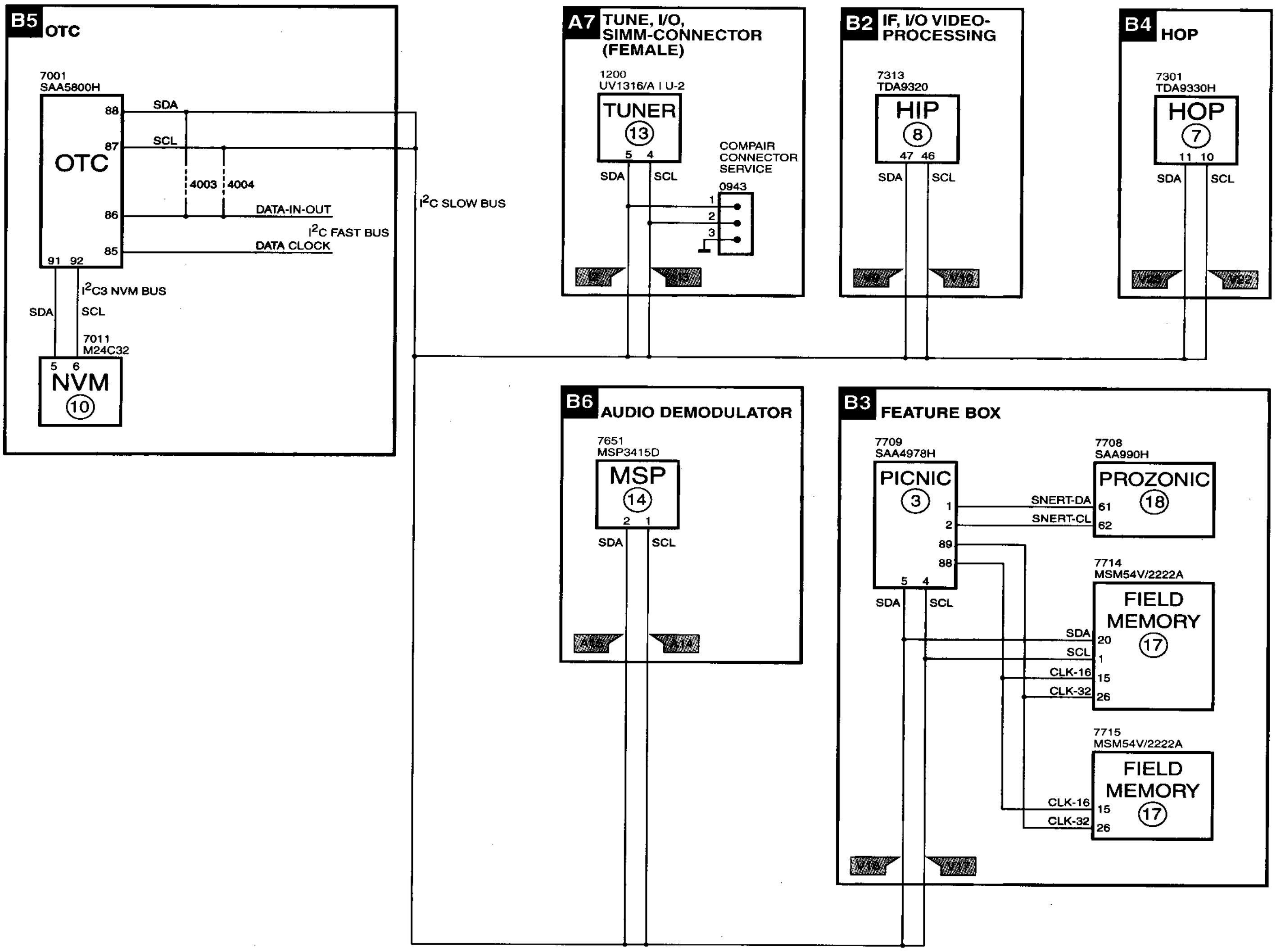
HONE
IER
7720
7722
7721
7723
B2 IF, I/O VIDEO PROCESSING
+8V
3400
+8VP
7323
HIP
7403
7320
7322
3416
7411
+5VS
B1
1205
1000
+5V 45
45 +5V
+8V 43
43 +8V
+5V2 40
40 +5V2
B3 FEATURE BOX
+5VA
7716
PICNIC-
EPROM
3798
3722
3721
5701
+5P
2702
7714
FIELD
MEMORY
3714
3720
3V3_INT
+5V
5703
5704
7713
5702
+3D
2706
2704
7715
FIELD
MEMORY
5706
+5M
5705
+3A
2712
2710
7708
PROZONIC
7701
7709
PICNIC
WITCH PANEL
+5V2
B4 HOP
+5VS
7005
+5V2
3304
+5VS
7311
2016
2013
2340
+5V
3300
+5VC
7324
7200
7001
OTC
5V SENSE
8V SENSE
+8V
3329
+8VS
7303
2300
2341
7340
7312
7301
HOP
5301
5302
+8VG
5651
3650
2665
5652
2666

CL96532156_032.eps
140100

## I2C bus


CL 06532156_033.eps
120100
E MAIN SWITCH PANEL
0202 (2)
0201 (2)
0947 (5)
0923 (2)
n.c.
B SMALL SIGNAL BOARD
1409 (2)
1000 (80)
DEFLECTION COIL PANEL
(connected to deflection coil)
0945 (3)
F CRT PANEL
SCAVEM COIL
0383 (3)
0340 (11)
FOCUS
0224 (7)
0334 (1)
VG2
CRT
A LARGE SIGNAL PANEL
0947 (5)
0010 (2)
0324 (7)
0325 (3)
1003 (1)
LOT
red
VG2
white
Focus
EHT
0317 (2)
1901-A/B (2x21) SCART
0945 (3)
n.c.
0045 (5)
1205 (80)
0936 (11)
0940 (11)
1902
1201 (1)
0946 (2)
1200
9943 (3)
compair interface
0737 (3)
0738 (3)
0736 (3)
0735 (3)
0739 (3)
BLACK
RED
SUBWOOFER
CENTRE
LEFT SPEAKER
RIGHT SPEAKER
SW
P TOP CONTROL PANEL
0345 (3)
O I/O PANEL
HEADPHONE
RIGHT (RED)
LEFT (WHITE)
CVBS (YELLOW)
SVHS
0902
0901
0936 (11)

# I2C overview


B5
OTC
7001
SAA5800H
OTC
88
87
86
85
91 92
SDA
SCL
4003
4004
DATA-IN-OUT
I2C FAST BUS
DATA CLOCK
I2C SLOW BUS
I2C3 NVM BUS
SDA
SCL
7011
M24C32
5 6
NVM
10
A7
TUNE, I/O,
SIMM-CONNECTOR
(FEMALE)
1200
UV1316/A I U-2
TUNER
13
5 4
SDA
SCL
COMPAIR
CONNECTOR
SERVICE
0943
1
2
3
B2
IF, I/O VIDEO-
PROCESSING
7313
TDA9320
HIP
8
47 46
SDA
SCL
V10
B4
HOP
7301
TDA9330H
HOP
7
11 10
SDA
SCL
V22
B6
AUDIO DEMODULATOR
7651
MSP3415D
MSP
14
2 1
SDA
SCL
A14
B3
FEATURE BOX
7709
SAA4978H
PICNIC
3
1
2
89
88
5 4
SDA
SCL
V17
7708
SAA990H
PROZONIC
18
SNERT-DA
SNERT-CL
61
62
7714
MSM54V/2222A
FIELD
MEMORY
17
SDA
SCL
CLK-16
CLK-32
20
1
15
26
7715
MSM54V/2222A
FIELD
MEMORY
17
CLK-16
CLK-32
15
26

| Error | Device | Description | Defective item | Diagram | Defect. module indication |
|---|---|---|---|---|---|
| 1 | Beam Current protection | BC-PROT | | | Beam Current |
| 2 | H fail protection | HFB | | | Horizontal Flyback |
| 3 | SAA4978 | PICNIC | 7709 | B3 | Feature Box |
| 4 | Supply 5V | 5V2 | | | +5V Supply |
| 5 | Supply 5V | 8V6 | | | +8V Supply |
| 6 | Slow I$^2$C-bus blocked | | | | Slow I$^2$C blocked |
| 7 | TDA9330 | HOP video control/geometry | 7301 | B4 | Video Controller |
| 8 | TDA9320 | HIP I/O-video processing | 7323 | B2 | Chroma IF IO |
| 9 | X-ray protection | | | A3 | |
| 10 | ST24E32 | NVM | 7011 | B5 | Control |
| 11 | HOP protection | | | | |
| 12 | Tuner protection | TUNER_prot | | | +8V (Tuner) Supply |
| 13 | UV1316 | Tuner | U1200 | A7 | Tuner |
| 14 | MSP3451/3415 | ITT sound processor + Dolby | 7651 | B6 | Audio Module |
| 15 | Flash protection | | | | |
| 16 | Featurebox protection | FBX_PROT | | | |
| 17 | SAA4956 | DNR-memory | 7714 | B3 | |
| 18 | SAA4990 | PROZONIC | 7708 | B3 | |

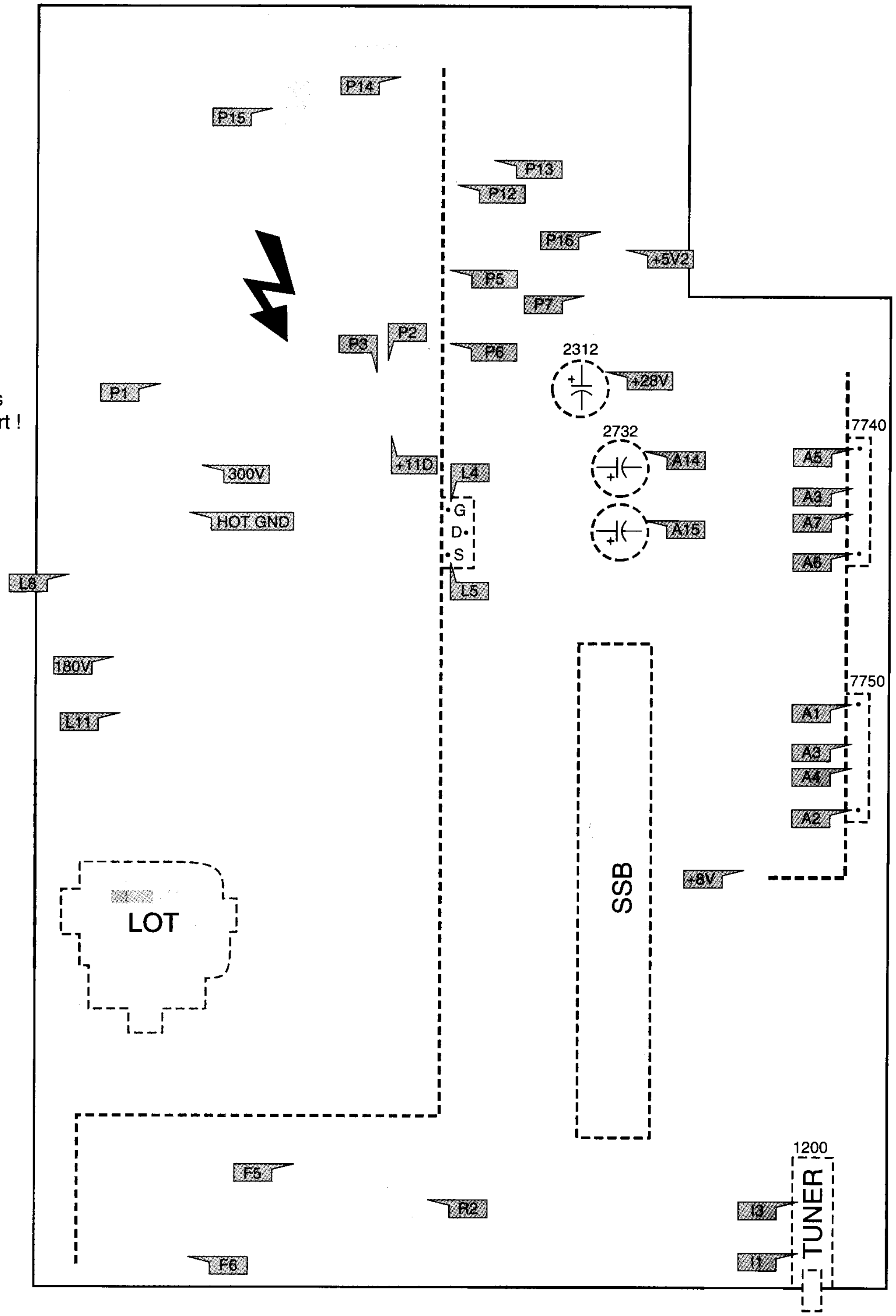
CL96532156_034.eps
140100

## Testpoint overview LSP panel

### Large Signal panel (LSP) (copper side)

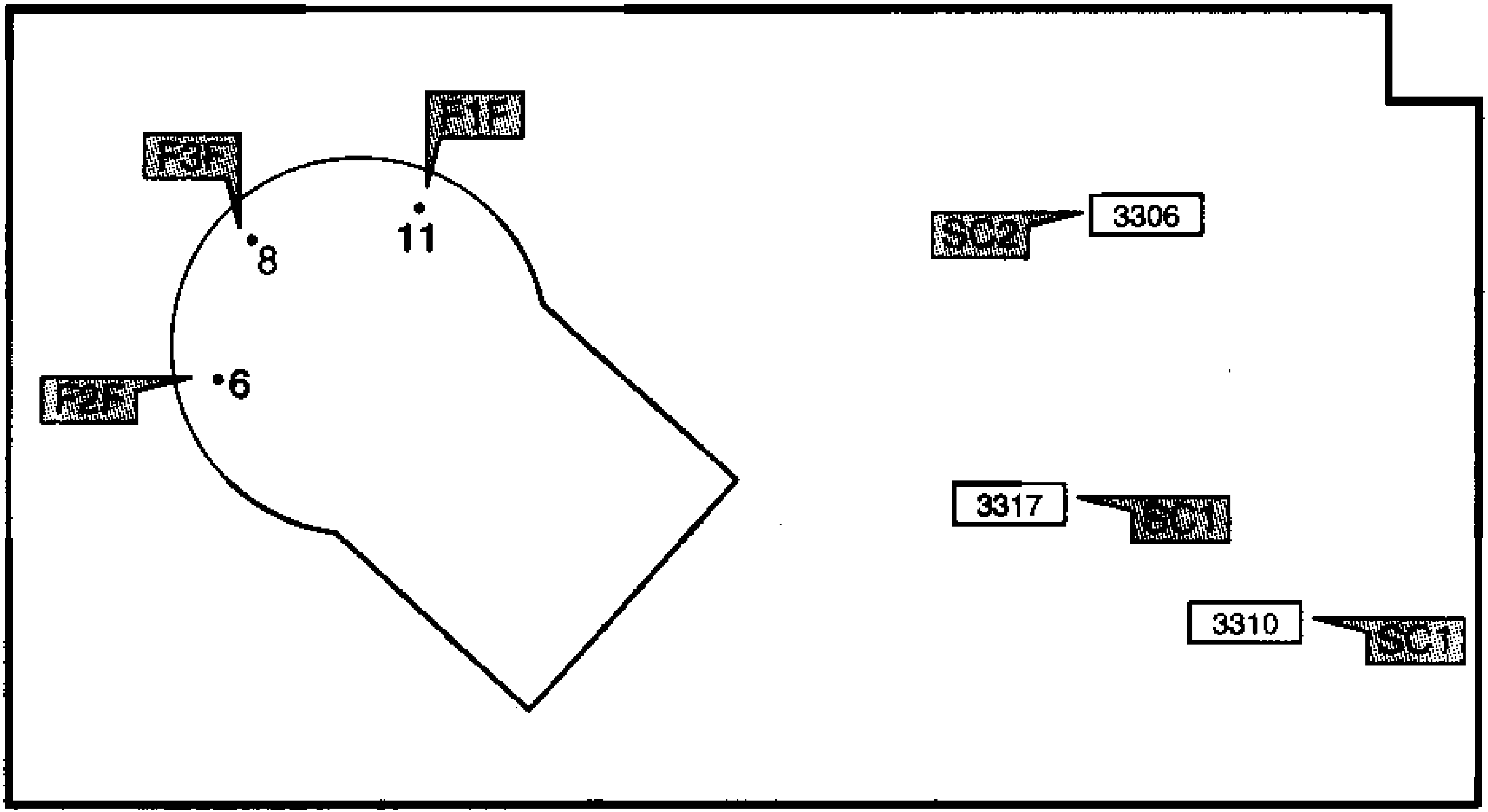
Warning

All alignments are on hot-part !


P14
P15
P13
P12
P16
+5V2
P5
P7
P3
P2
P6
2312
+28V
P1
2732
A14
A15
7740
A5
A8
A7
A6
+11D
L4
G
D
S
L5
300V
HOT GND
L8
180V
L11
7750
A1
A3
A4
A2
+8V
SSB
LOT
F5
R2
F6
1200
TUNER
I3
I1

CL 96532156_088.eps
280200

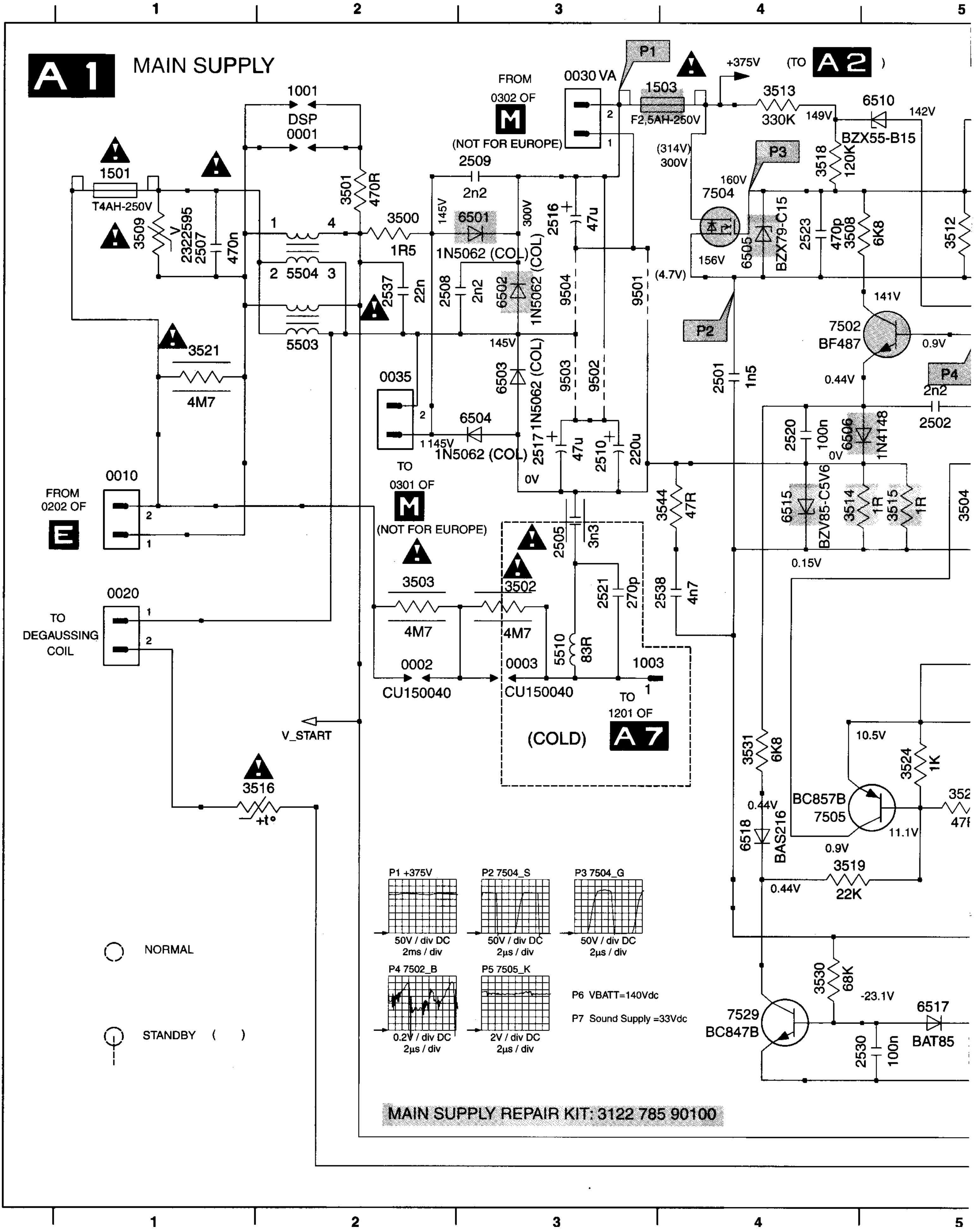
# Testpoint overview CRT panel


8
11
6
3306
3317
3310

CL 96532156_087.eps
280200

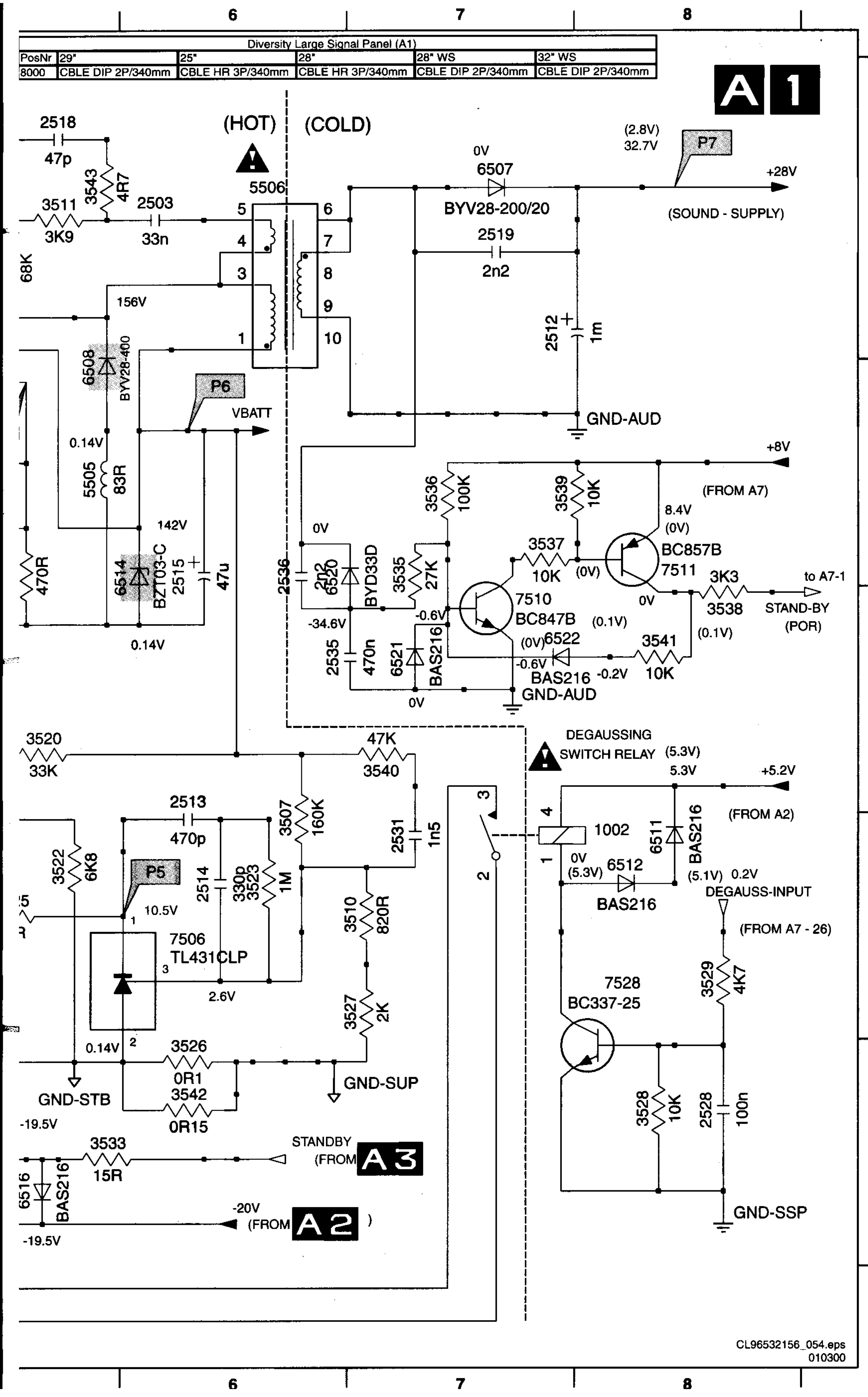
# 7. Schematics and PWB's

## Main supply



A1 MAIN SUPPLY
1
2
3
4
5
1001
DSP
0001
1501
T4AH-250V
3509
2322595
2507
470n
3501
470R
5504
5503
3500
1R5
3521
4M7
2537
22n
FROM
0302 OF
M
(NOT FOR EUROPE)
2509
2n2
6501
1N5062 (COL)
145V
300V
2508
2n2
6502
1N5062 (COL)
2516
47u
9504
9501
0030 VA
P1
1503
F2,5AH-250V
+375V
(TO A2)
3513
330K
149V
6510
142V
BZX55-B15
3518
120K
(314V)
300V
P3
160V
7504
156V
6505
BZX79-C15
2523
470p
3508
6K8
3512
(4.7V)
P2
141V
7502
BF487
0.9V
0.44V
P4
2n2
2502
2501
1n5
2520
100n
6506
1N4148
0V
6515
BZV85-C5V6
3514
1R
3515
1R
3504
0.15V
0035
6503
1N5062 (COL)
6504
1N5062 (COL)
145V
9503
9502
2517
47u
2510
220u
0V
TO
0301 OF
M
(NOT FOR EUROPE)
3544
47R
2505
3n3
2521
270p
2538
4n7
FROM
0202 OF
E
0010
0020
TO
DEGAUSSING
COIL
3503
4M7
3502
4M7
5510
83R
0002
CU150040
0003
CU150040
1003
TO
1201 OF
A7
(COLD)
V_START
3516
+t°
3531
6K8
0.44V
6518
BAS216
BC857B
7505
10.5V
3524
1K
11.1V
0.9V
3519
22K
0.44V
352
47
3530
68K
-23.1V
6517
BAT85
7529
BC847B
2530
100n
P1 +375V
50V / div DC
2ms / div
P2 7504_S
50V / div DC
2µs / div
P3 7504_G
50V / div DC
2µs / div
P4 7502_B
0.2V / div DC
2µs / div
P5 7505_K
2V / div DC
2µs / div
P6 VBATT=140Vdc
P7 Sound Supply =33Vdc
NORMAL
STANDBY ( )

MAIN SUPPLY REPAIR KIT: 3122 785 90100



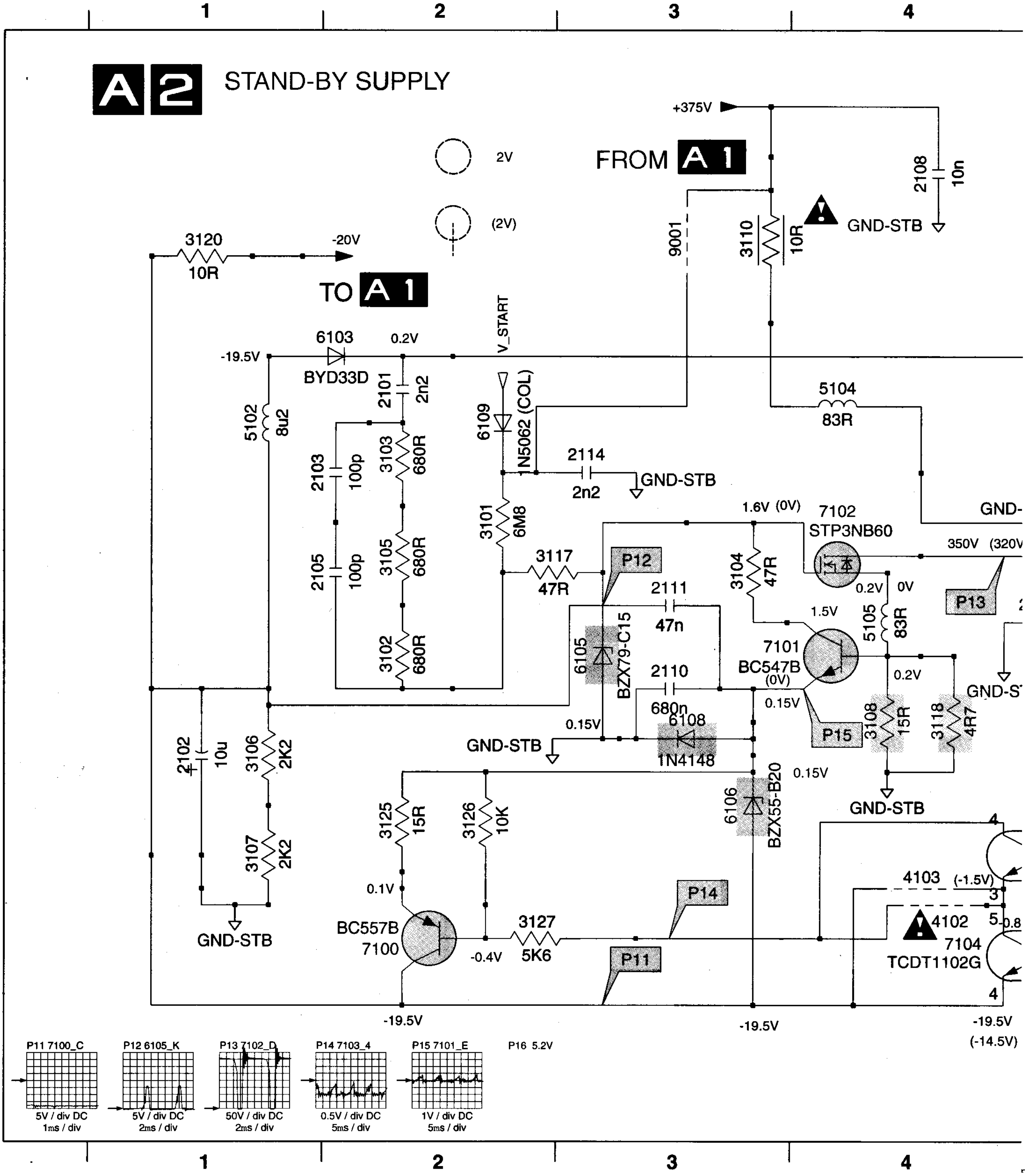
6
7
8
A1
(HOT)
(COLD)
2518
47p
3543
4R7
3511
3K9
2503
33n
68K
5506
5
4
3
1
6
7
8
9
10
156V
6508
BYV28-400
P6
VBATT
0.14V
5505
83R
142V
470R
6514
BZT03-C
2515
47u
0.14V
0V
6507
BYV28-200/20
(2.8V)
32.7V
P7
+28V
(SOUND - SUPPLY)
2519
2n2
2512
1m
GND-AUD
+8V
(FROM A7)
3536
100K
3539
10K
8.4V
(0V)
BC857B
7511
0V
2536
2n2
6520
BYD33D
3535
27K
3537
10K
(0V)
7510
BC847B
3K3
3538
to A7-1
STAND-BY
(POR)
-34.6V
-0.6V
(0.1V)
(0.1V)
2535
470n
6521
BAS216
(0V)6522
-0.6V
BAS216
-0.2V
3541
10K
0V
GND-AUD
DEGAUSSING
SWITCH RELAY
(5.3V)
5.3V
+5.2V
(FROM A2)
3520
33K
47K
3540
2513
470p
3507
160K
2531
1n5
3
4
1002
6511
BAS216
3522
6K8
P5
2514
330p
3523
1M
1
2
0V
(5.3V)
6512
BAS216
(5.1V)
0.2V
DEGAUSS-INPUT
(FROM A7 - 26)
3510
820R
10.5V
7506
TL431CLP
3
2.6V
3527
2K
7528
BC337-25
3529
4K7
0.14V
2
3526
0R1
3542
0R15
GND-STB
GND-SUP
3528
10K
2528
100n
-19.5V
3533
15R
STANDBY
(FROM A3
6516
BAS216
-20V
(FROM A2 )
-19.5V
GND-SSP
A
B
C
D
E
CL96532156_054.eps
010300

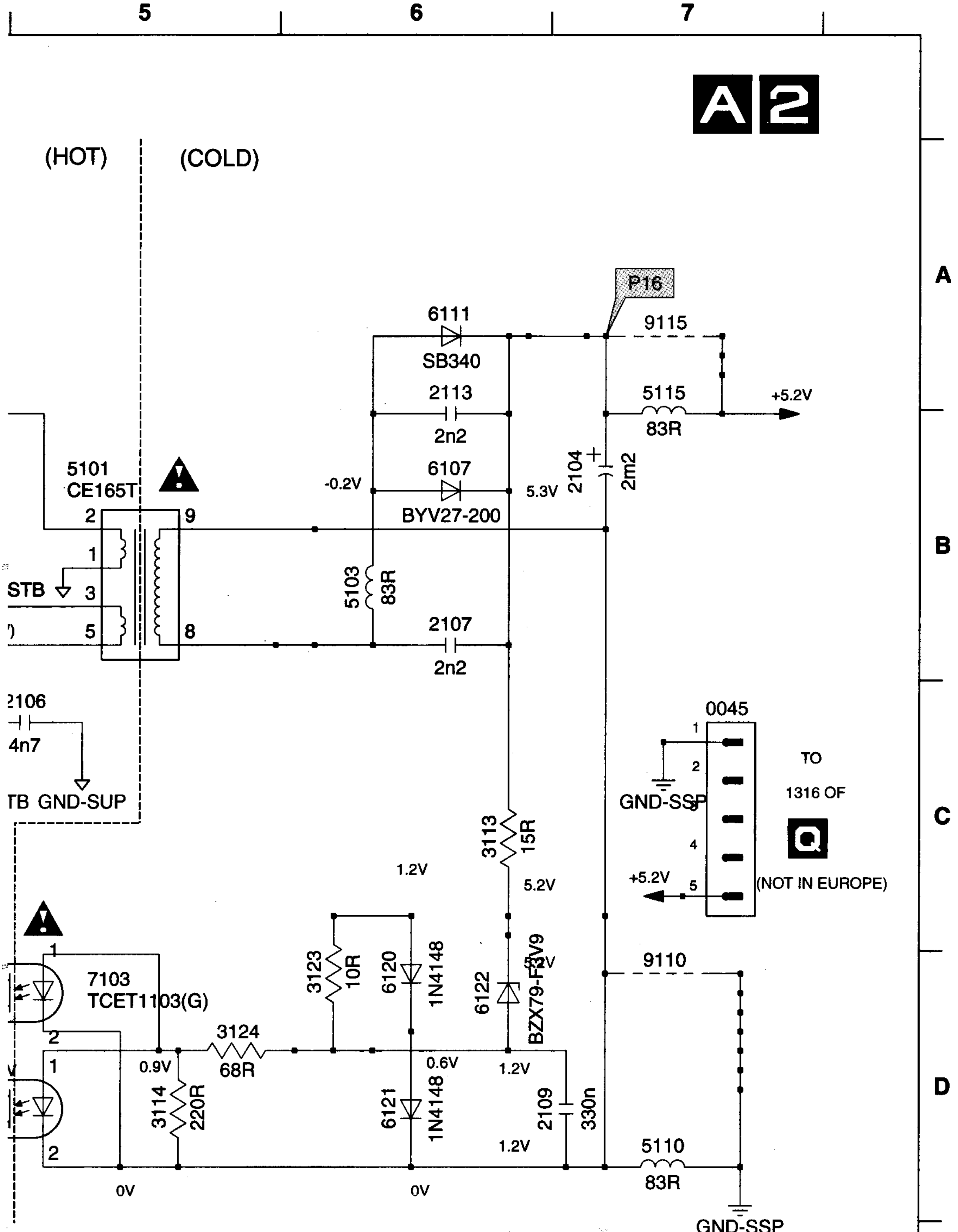
| Diversity Large Signal Panel (A1) | | | | | |
|---|---|---|---|---|---|
| PosNr | 29" | 25" | 28" | 28" WS | 32" WS |
| 8000 | CBLE DIP 2P/340mm | CBLE HR 3P/340mm | CBLE HR 3P/340mm | CBLE DIP 2P/340mm | CBLE DIP 2P/340mm |

| | |
|---|---|
| 0001 | A2 |
| 0002 | C2 |
| 0003 | C3 |
| 0010 | B1 |
| 0020 | C1 |
| 0030 | A3 |
| 0035 | B2 |
| 1001 | A2 |
| 1002 | D8 |
| 1003 | C4 |
| 1501 | A1 |
| 1503 | A4 |
| 2501 | B4 |
| 2502 | B5 |
| 2503 | A6 |
| 2505 | C3 |
| 2507 | A1 |
| 2508 | A2 |
| 2509 | A3 |
| 2510 | B3 |
| 2512 | A7 |
| 2513 | C6 |
| 2514 | D6 |
| 2515 | B6 |
| 2516 | A3 |
| 2517 | B3 |
| 2518 | A5 |
| 2519 | A7 |
| 2520 | B4 |
| 2521 | C3 |
| 2523 | A4 |
| 2528 | E8 |
| 2530 | E5 |
| 2531 | D7 |
| 2535 | C6 |
| 2536 | B6 |
| 2537 | A2 |
| 2538 | C4 |
| 3500 | A2 |
| 3501 | A2 |
| 3502 | C3 |
| 3503 | C2 |
| 3504 | B5 |
| 3507 | D6 |
| 3508 | A4 |
| 3509 | A1 |
| 3510 | D7 |
| 3511 | A5 |
| 3512 | A5 |
| 3513 | A4 |
| 3514 | B4 |
| 3515 | B5 |
| 3516 | D2 |
| 3518 | A4 |
| 3519 | D4 |
| 3520 | C5 |
| 3521 | B1 |
| 3522 | D5 |
| 3523 | D6 |
| 3524 | D5 |
| 3525 | D5 |
| 3526 | E6 |
| 3527 | D7 |
| 3528 | E8 |
| 3529 | D8 |
| 3530 | E4 |
| 3531 | D4 |
| 3533 | E5 |
| 3535 | B7 |
| 3536 | B7 |
| 3537 | B7 |
| 3538 | C8 |
| 3539 | B7 |
| 3540 | C7 |
| 3541 | C8 |
| 3542 | E6 |
| 3543 | A5 |
| 3544 | B4 |
| 5503 | B2 |
| 5504 | A2 |
| 5505 | B5 |
| 5506 | A6 |
| 5510 | C3 |
| 6501 | A3 |
| 6502 | A3 |
| 6503 | B3 |
| 6504 | B3 |
| 6505 | A4 |
| 6506 | B4 |
| 6507 | A7 |
| 6508 | B5 |
| 6510 | A5 |
| 6511 | D8 |
| 6512 | D8 |
| 6514 | B6 |
| 6515 | B4 |
| 6516 | E5 |
| 6517 | E5 |
| 6518 | D4 |
| 6520 | B6 |
| 6521 | C7 |
| 6522 | C7 |
| 7502 | B5 |
| 7504 | A4 |
| 7505 | D4 |
| 7506 | D6 |
| 7510 | C7 |
| 7511 | B8 |
| 7528 | D8 |
| 7529 | E4 |
| 9501 | A3 |
| 9502 | B3 |
| 9503 | B3 |
| 9504 | A3 |

## Standby supply

0045 C7
2101 B2
2102 C1
2103 B2
2104 B7
2105 B2
2106 C5
2107 B6
2108 A4
2109 D7
2110 C3
2111 C3
2113 A6
2114 B3
3101 B2
3102 C2
3103 B2
3104 B3
3105 B2
3106 C1
3107 D1
3108 C4
3110 A3
3113 C6
3114 D5
3117 B2
3118 C4
3120 A1
3123 D6
3124 D5
3125 D2
3126 D2
3127 D2
4102 D4
4103 D4
5101 B5
5102 B1
5103 B6
5104 B4
5105 C4
5110 D7
5115 A7
6103 A2
6105 C3
6106 C3
6107 B6
6108 C3
6109 B2
6111 A6
6120 D6
6121 D6
6122 D6
7100 D2
7101 C4
7102 B4
7103 D5
7104 D4
9001 A3
9110 D7


1
2
3
4
A2 STAND-BY SUPPLY
2V
(2V)
+375V
FROM A1
2108
10n
GND-STB
9001
3110
10R
3120
10R
-20V
TO A1
V_START
6103
BYD33D
0.2V
-19.5V
5102
8u2
2101
2n2
2103
100p
3103
680R
2105
100p
3105
680R
3102
680R
6109
1N5062 (COL)
2114
2n2
GND-STB
3101
6M8
3117
47R
P12
5104
83R
GND-
1.6V (0V)
7102
STP3NB60
350V (320V
3104
47R
2111
47n
0.2V
0V
P13
1.5V
5105
83R
6105
BZX79-C15
7101
BC547B
(0V)
2110
680n
0.2V
GND-S
0.15V
0.15V
6108
1N4148
P15
3108
15R
3118
4R7
GND-STB
2102
10u
3106
2K2
3107
2K2
GND-STB
6106
BZX55-B20
0.15V
GND-STB
3125
15R
3126
10K
0.1V
BC557B
7100
-0.4V
3127
5K6
P11
P14
4103
(-1.5V)
4102
7104
TCDT1102G
-19.5V
-19.5V
-19.5V
(-14.5V)
P11 7100_C
5V / div DC
1ms / div
P12 6105_K
5V / div DC
2ms / div
P13 7102_D
50V / div DC
2ms / div
P14 7103_4
0.5V / div DC
5ms / div
P15 7101_E
1V / div DC
5ms / div
P16 5.2V
1
2
3
4

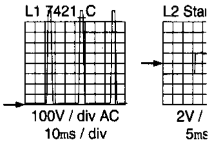

5
6
7
A2
(HOT)
(COLD)
A
B
C
D
P16
6111
SB340
9115
2113
2n2
5115
83R
+5.2V
5101
CE165T
-0.2V
6107
BYV27-200
5.3V
2104
2m2
2
9
1
STB
3
5
8
5103
83R
2107
2n2
2106
4n7
TB GND-SUP
0045
1
2
3
4
5
TO
1316 OF
Q
GND-SSP
+5.2V
(NOT IN EUROPE)
3113
15R
1.2V
5.2V
7103
TCET1103(G)
3123
10R
6120
1N4148
6122
BZX79-F5V9
5.2V
9110
3124
68R
0.9V
0.6V
1.2V
3114
220R
6121
1N4148
2109
330n
1.2V
5110
83R
0V
0V
GND-SSP

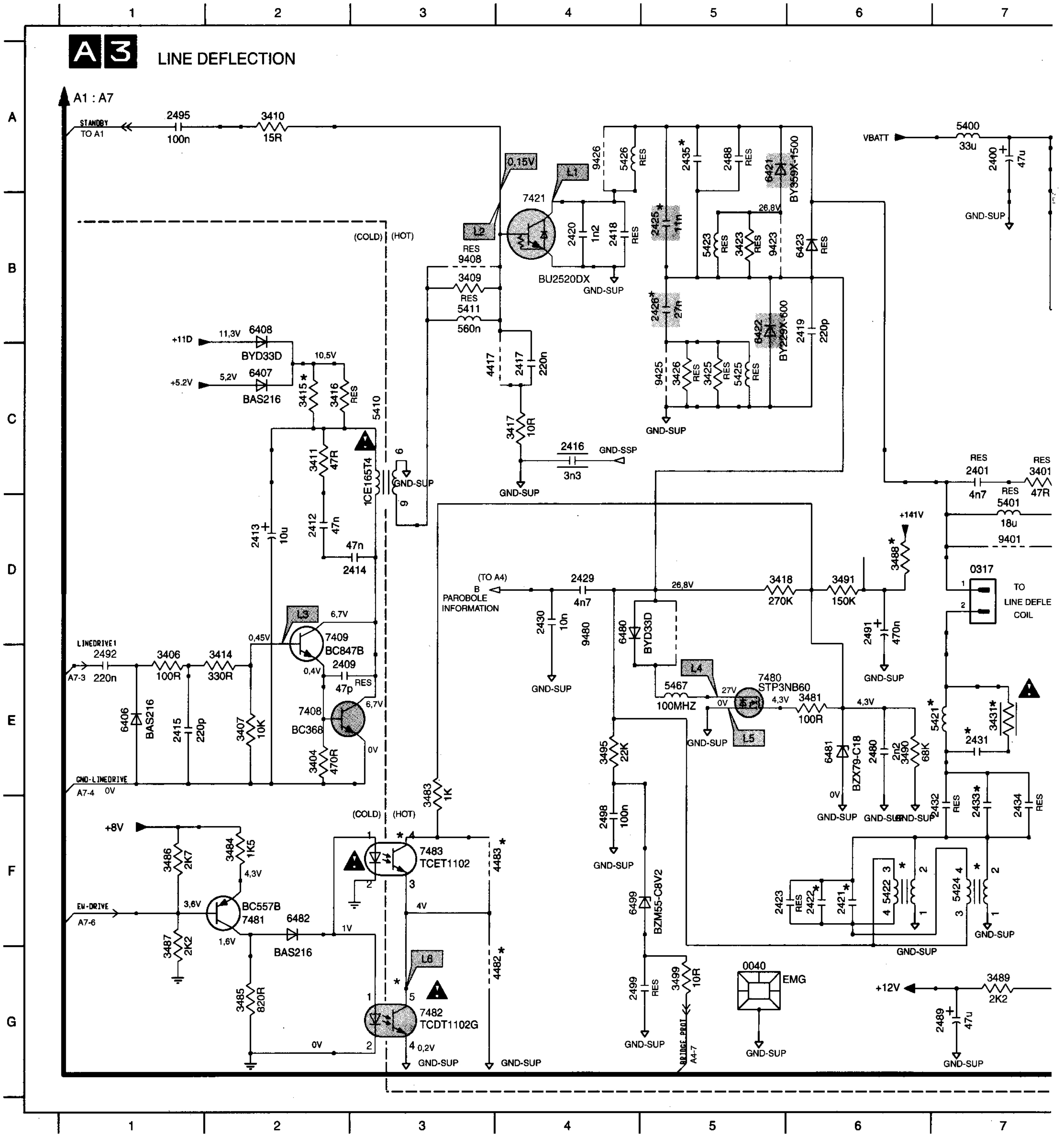
STANDBY SUPPLY REPAIR KIT: 3122 785 90110

CL96532156_055.eps
010300

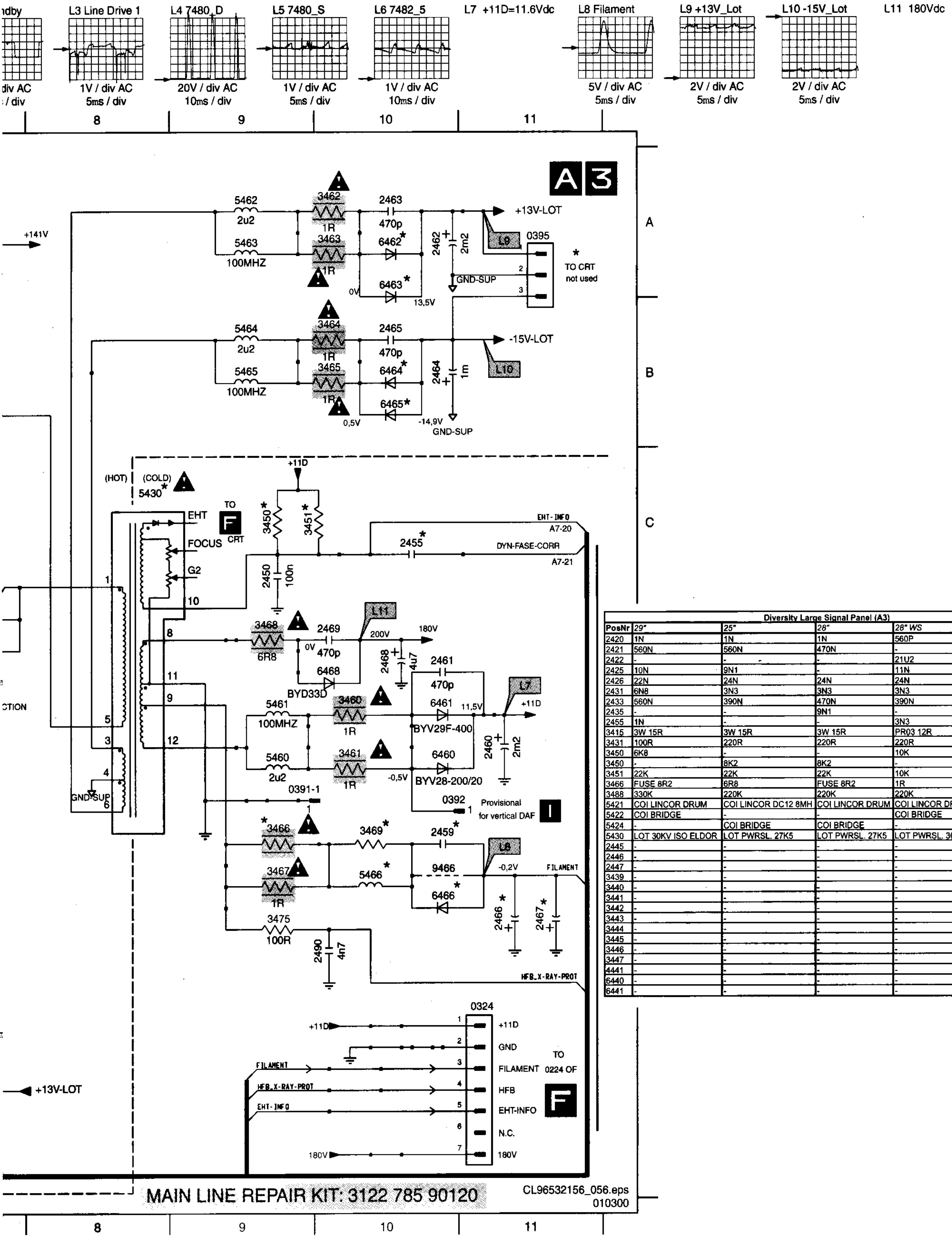
# Line deflection

|  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2400 A7 | 2421 F6 | 2450 C9 | 2469 D10 | 3406 E1 | 3426 C5 | 3468 D9 | 3491 D6 | 5423 B5 | 5467 E5 | 6465 B10 | 7482 G3 |
| 2401 C7 | 2422 F6 | 2455 C10 | 2480 E6 | 3407 E2 | 3431 E7 | 3469 E10 | 3495 E4 | 5424 F7 | 6406 E1 | 6466 F10 | 7483 F3 |
| 2409 E2 | 2423 F5 | 2459 E10 | 2488 A5 | 3409 B3 | 3450 C9 | 3475 F9 | 3499 G5 | 5425 C5 | 6407 C2 | 6468 D10 | 9401 D7 |
| 2412 D2 | 2425 B5 | 2460 D11 | 2489 G7 | 3410 A2 | 3451 C9 | 3481 E6 | 4417 C3 | 5426 A4 | 6408 B2 | 6480 D4 | 9408 B3 |
| 2413 D2 | 2426 B5 | 2461 D10 | 2490 F10 | 3411 C2 | 3460 D10 | 3483 F3 | 4482 G3 | 5430 C8 | 6421 A5 | 6481 E6 | 9423 B5 |
| 2414 D3 | 2429 D4 | 2462 A10 | 2491 D6 | 3414 E2 | 3461 E10 | 3484 F2 | 4483 F3 | 5460 E9 | 6422 B5 | 6482 F2 | 9425 C5 |





1
2
3
4
5
6
7
A
B
C
D
E
F
G
A3
LINE DEFLECTION
A1 : A7
STANDBY
TO A1
2495
100n
3410
15R
0,15V
L1
L2
7421
BU2520DX
GND-SUP
2420
1n2
2418
RES
9426
5426
RES
2435
2488
RES
6421
BY359X-1500
26,8V
2425
11n
5423
RES
3423
RES
9423
6423
RES
2426
27n
6422
BY229X-600
2419
220p
9425
3426
RES
3425
RES
5425
RES
GND-SUP
VBATT
5400
33u
2400
47u
GND-SUP
(COLD)
(HOT)
RES
9408
3409
RES
5411
560n
4417
2417
220n
3417
10R
2416
3n3
GND-SSP
GND-SUP
+11D
11,3V
6408
BYD33D
+5.2V
5,2V
6407
BAS216
10,5V
3415
3416
RES
5410
3411
47R
2412
47n
2413
10u
47n
2414
1CE165T4
6
9
GND-SUP
RES
2401
4n7
RES
3401
47R
RES
5401
18u
9401
+141V
3488
0317
1
2
TO
LINE DEFLE
COIL
(TO A4)
B
PAROBOLE
INFORMATION
2429
4n7
26,8V
3418
270K
3491
150K
2430
10n
9480
GND-SUP
6480
BYD33D
2491
470n
GND-SUP
L3
6,7V
0,45V
7409
BC847B
2409
47p
RES
0,4V
6,7V
7408
BC368
0V
3404
470R
LINEDRIVE1
2492
220n
A7-3
3406
100R
3414
330R
6406
BAS216
2415
220p
3407
10K
GND-LINEDRIVE
A7-4
0V
L4
5467
100MHZ
27V
0V
7480
STP3NB60
4,3V
3481
100R
4,3V
L5
GND-SUP
3495
22K
6481
BZX79-C18
0V
2480
2n2
3490
68K
GND-SUP
GND-SUP
GND-SUP
5421
3431
2431
2432
RES
2433
2434
RES
3483
1K
(COLD)
(HOT)
+8V
3486
2K7
3484
1K5
4,3V
EW-DRIVE
A7-6
3,6V
BC557B
7481
6482
BAS216
1V
1,6V
3487
2K2
3485
820R
7483
TCET1102
1
2
3
4
4483
4V
2498
100n
GND-SUP
6499
BZM55-C8V2
2423
RES
2422
2421
5422
3
1
4
2
5424
3
1
4
2
GND-SUP
GND-SUP
L6
4482
7482
TCDT1102G
1
2
5
4
0,2V
0V
GND-SUP
GND-SUP
2499
RES
3499
10R
BRIDGE PROT
A4-7
GND-SUP
0040
EMG
GND-SUP
+12V
3489
2K2
2489
47u
GND-SUP



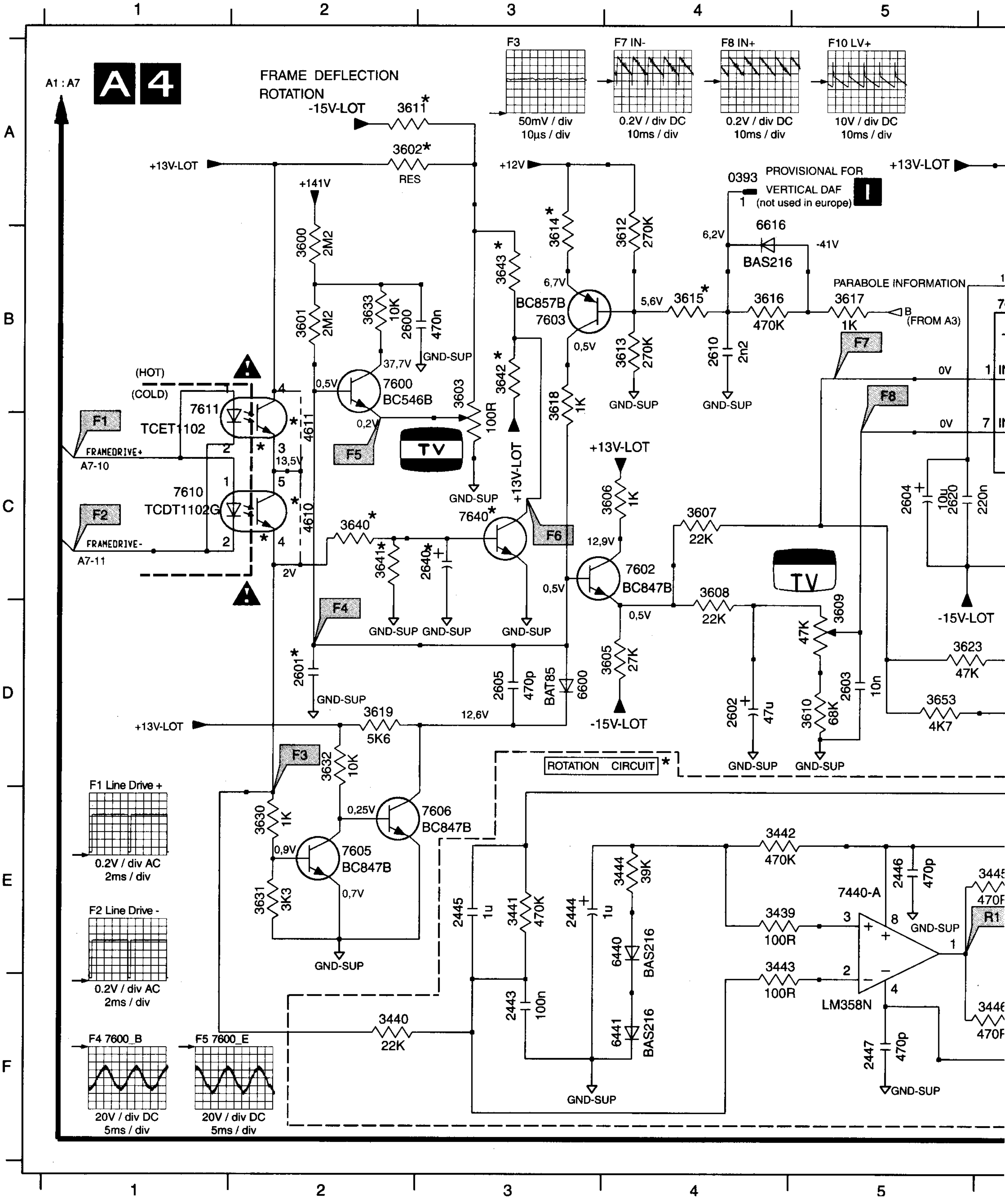
ıdby
L3 Line Drive 1
L4 7480_D
L5 7480_S
L6 7482_5
L7 +11D=11.6Vdc
L8 Filament
L9 +13V_Lot
L10 -15V_Lot
L11 180Vdc
div AC
: / div
1V / div AC
5ms / div
20V / div AC
10ms / div
1V / div AC
5ms / div
1V / div AC
10ms / div
5V / div AC
5ms / div
2V / div AC
5ms / div
2V / div AC
5ms / div
8
9
10
11
A3
A
B
C
+141V
5462
2u2
5463
100MHZ
3462
1R
3463
1R
2463
470p
6462*
6463*
0V
13,5V
2462
2m2
+13V-LOT
L9
0395
2
3
GND-SUP
*
TO CRT
not used
5464
2u2
5465
100MHZ
3464
1R
3465
1R
2465
470p
6464*
6465*
0,5V
-14,9V
2464
1m
GND-SUP
-15V-LOT
L10
(HOT)
(COLD)
5430*
+11D
TO
F
CRT
EHT
FOCUS
G2
1
10
8
11
9
5
3
12
4
6
GND-SUP
3450*
3451*
2455*
EHT-INFO
A7-20
DYN-FASE-CORR
A7-21
2450
100n
3468
6R8
2469
0V
470p
6468
BYD33D
L11
200V
180V
2468
4u7
2461
470p
5461
100MHZ
3460
1R
6461
11,5V
BYV29F-400
L7
+11D
2460
2m2
5460
2u2
3461
1R
-0,5V
6460
BYV28-200/20
0391-1
0392
1
Provisional
for vertical DAF
I
CTION
*3466
3469*
2459*
L8
3467
1R
5466*
9466
-0,2V
FILAMENT
6466*
2466*
2467*
3475
100R
2490
4n7
HFB_X-RAY-PROT
0324
+11D
1
+11D
2
GND
3
FILAMENT
4
HFB
5
EHT-INFO
6
N.C.
7
180V
FILAMENT
HFB_X-RAY-PROT
EHT-INFO
180V
TO
0224 OF
F
+13V-LOT

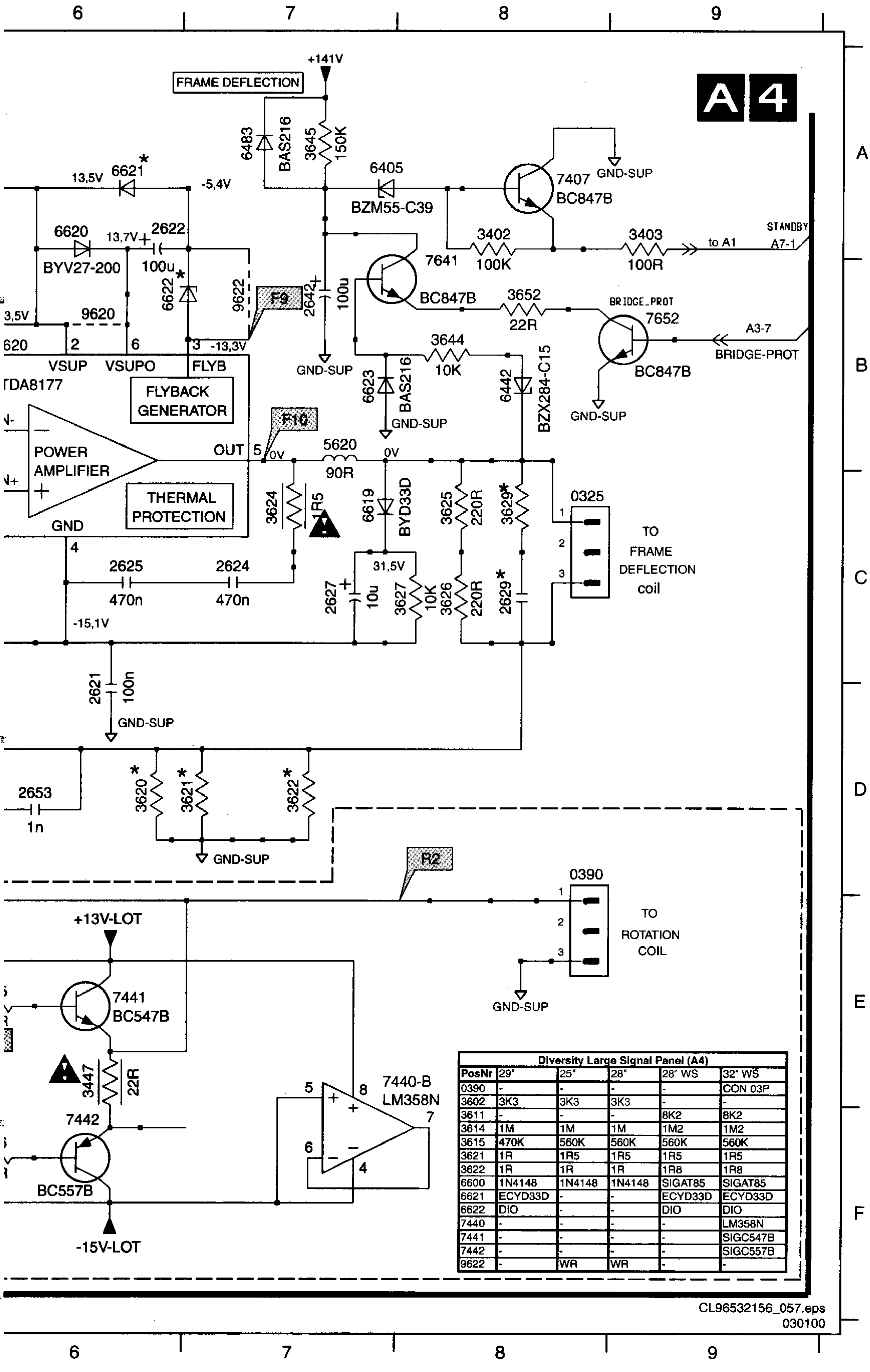
MAIN LINE REPAIR KIT: 3122 785 90120

CL96532156_056.eps
010300

| Diversity Large Signal Panel (A3) | | | | | |
|---|---|---|---|---|---|
| PosNr | *29"* | *25"* | *28"* | *28" WS* | *32" WS* |
| 2420 | 1N | 1N | 1N | 560P | 1N |
| 2421 | 560N | 560N | 470N | - | - |
| 2422 | - | - | - | 21U2 | 21U2 |
| 2425 | 10N | 9N1 | - | 11N | 11N |
| 2426 | 22N | 24N | 24N | 24N | 24N |
| 2431 | 6N8 | 3N3 | 3N3 | 3N3 | 3N3 |
| 2433 | 560N | 390N | 470N | 390N | 430N |
| 2435 | - | - | 9N1 | - | - |
| 2455 | 1N | - | - | 3N3 | 3N3 |
| 3415 | 3W 15R | 3W 15R | 3W 15R | PR03 12R | PR03 12R |
| 3431 | 100R | 220R | 220R | 220R | 220R |
| 3450 | 6K8 | - | - | 10K | 10K |
| 3450 | - | 8K2 | 8K2 | - | - |
| 3451 | 22K | 22K | 22K | 10K | 10K |
| 3466 | FUSE 8R2 | 6R8 | FUSE 8R2 | 1R | 1R |
| 3488 | 330K | 220K | 220K | 220K | 120K |
| 5421 | COI LINCOR DRUM | COI LINCOR DC12 8MH | COI LINCOR DRUM | COI LINCOR DRUM | COI LINCOR DRUM |
| 5422 | COI BRIDGE | - | - | COI BRIDGE | COI BRIDGE |
| 5424 | - | COI BRIDGE | COI BRIDGE | - | - |
| 5430 | LOT 30KV ISO ELDOR | LOT PWRSL. 27K5 | LOT PWRSL. 27K5 | LOT PWRSL. 30KV | LOT PWRSL. 30KV |
| 2445 | - | - | - | - | 1U |
| 2446 | - | - | - | - | 470P |
| 2447 | - | - | - | - | 470P |
| 3439 | - | - | - | - | 100R |
| 3440 | - | - | - | - | 22K |
| 3441 | - | - | - | - | 470K |
| 3442 | - | - | - | - | 470K |
| 3443 | - | - | - | - | 100R |
| 3444 | - | - | - | - | 39K |
| 3445 | - | - | - | - | 2K2 |
| 3446 | - | - | - | - | 2K2 |
| 3447 | - | - | - | - | 22R |
| 4441 | - | - | - | - | JUMP |
| 6440 | - | - | - | - | SMAS216 |
| 6441 | - | - | - | - | SMAS216 |

## Frame deflection


1
2
3
4
5
A
B
C
D
E
F
A1 : A7
A4
FRAME DEFLECTION
ROTATION
-15V-LOT
3611*
3602*
RES
+13V-LOT
+141V
F3
50mV / div
10µs / div
F7 IN-
0.2V / div DC
10ms / div
F8 IN+
0.2V / div DC
10ms / div
F10 LV+
10V / div DC
10ms / div
+12V
+13V-LOT
0393
1
PROVISIONAL FOR
VERTICAL DAF
(not used in europe)
I
3600 2M2
3601 2M2
3633 10K
2600 470n
GND-SUP
37,7V
0,5V
7600
BC546B
0,2V
F5
TV
3603 100R
GND-SUP
3643*
3642*
+13V-LOT
3614*
3612 270K
6,7V
BC857B
7603
0,5V
3613 270K
GND-SUP
3618 1K
5,6V
3615*
6,2V
6616
BAS216
-41V
3616
470K
2610 2n2
GND-SUP
PARABOLE INFORMATION
3617
1K
B
(FROM A3)
F7
F8
0V
1
0V
7
(HOT)
(COLD)
7611
TCET1102
4
3
13,5V
4611
F1
FRAMEDRIVE+
A7-10
7610
TCDT1102G
1
2
5
2
4
4610
F2
FRAMEDRIVE-
A7-11
2V
3640*
3641*
2640*
7640*
F6
GND-SUP
GND-SUP
GND-SUP
+13V-LOT
3606 1K
12,9V
7602
BC847B
0,5V
0,5V
3607
22K
3608
22K
TV
3609 47K
2604 10u
2620 220n
-15V-LOT
3623
47K
3653
4K7
F4
2601*
GND-SUP
2605 470p
BAT85
6600
3605 27K
-15V-LOT
2602 47u
3610 68K
2603 10n
GND-SUP
GND-SUP
+13V-LOT
3619
5K6
12,6V
ROTATION CIRCUIT *
F3
3632 10K
0,25V
7606
BC847B
3630 1K
0,9V
7605
BC847B
3631 3K3
0,7V
GND-SUP
F1 Line Drive +
0.2V / div AC
2ms / div
F2 Line Drive -
0.2V / div AC
2ms / div
F4 7600_B
20V / div DC
5ms / div
F5 7600_E
20V / div DC
5ms / div
2445 1u
3441 470K
2443 100n
2444 1u
3444 39K
6440 BAS216
6441 BAS216
GND-SUP
3440
22K
3442
470K
3439
100R
3443
100R
7440-A
LM358N
3
8
2
4
1
2446 470p
GND-SUP
2447 470p
GND-SUP
3445
470R
R1
3446
470R

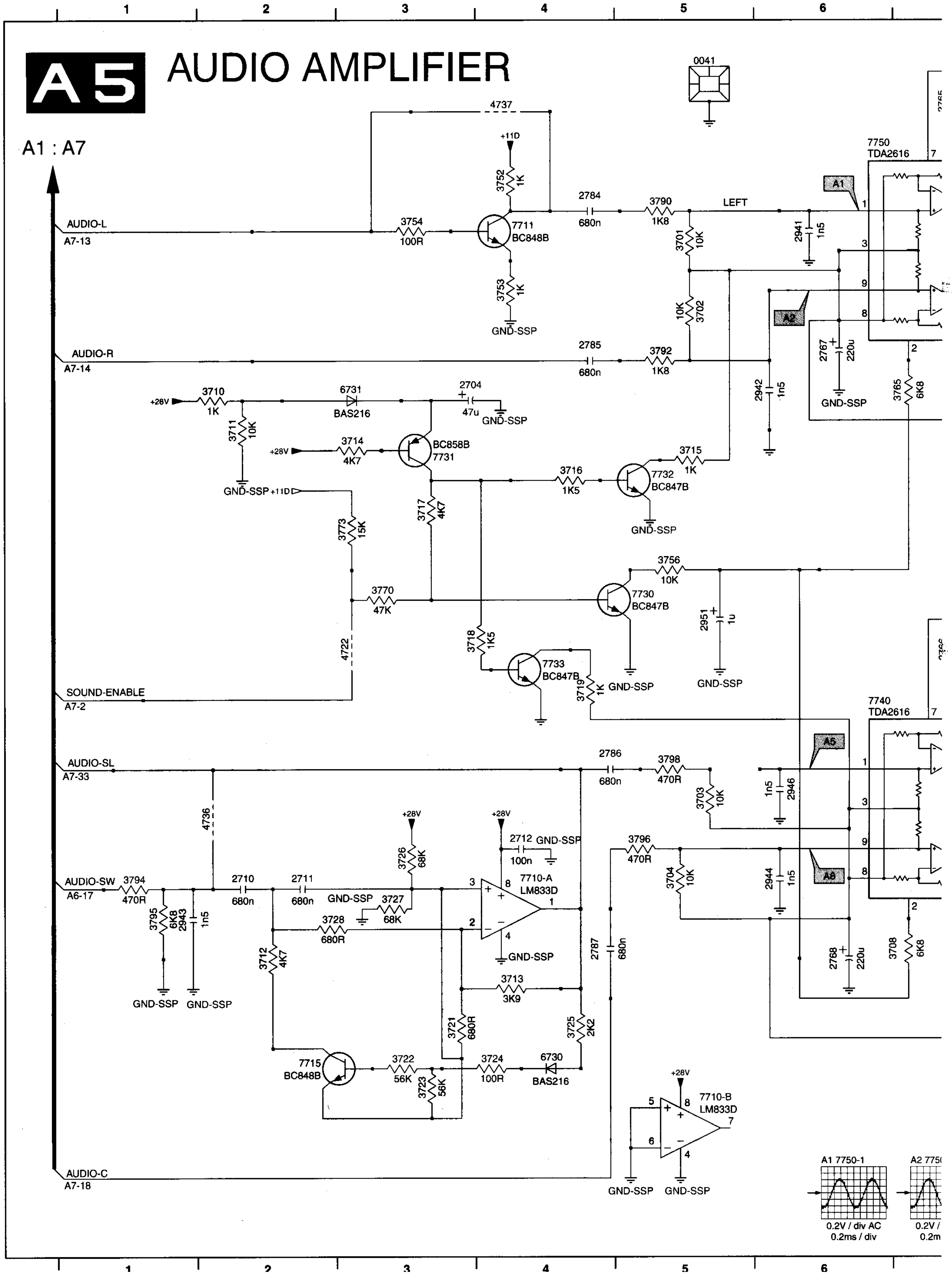

6
7
8
9
A4
A
B
C
D
E
F
+141V
FRAME DEFLECTION
6483
BAS216
3645
150K
13,5V
6621
*
-5,4V
6405
BZM55-C39
7407
BC847B
GND-SUP
6620
BYV27-200
13,7V
2622
100u
6622
9622
F9
2642
100u
7641
BC847B
3402
100K
3403
100R
to A1
STANDBY
A7-1
3,5V
9620
620
2
6
3
-13,3V
VSUP
VSUPO
FLYB
TDA8177
FLYBACK GENERATOR
POWER AMPLIFIER
THERMAL PROTECTION
GND
4
OUT
5
0V
F10
5620
90R
3652
22R
BRIDGE_PROT
7652
BC847B
A3-7
BRIDGE-PROT
3644
10K
6623
BAS216
6442
BZX284-C15
3624
1R5
6619
BYD33D
3625
220R
3629
0325
1
2
3
TO FRAME DEFLECTION coil
2625
470n
2624
470n
31,5V
2627
10u
3627
10K
3626
220R
2629
-15,1V
2621
100n
2653
1n
3620
3621
3622
R2
0390
TO ROTATION COIL
+13V-LOT
7441
BC547B
3447
22R
7442
BC557B
-15V-LOT
7440-B
LM358N
5
8
7
6
4

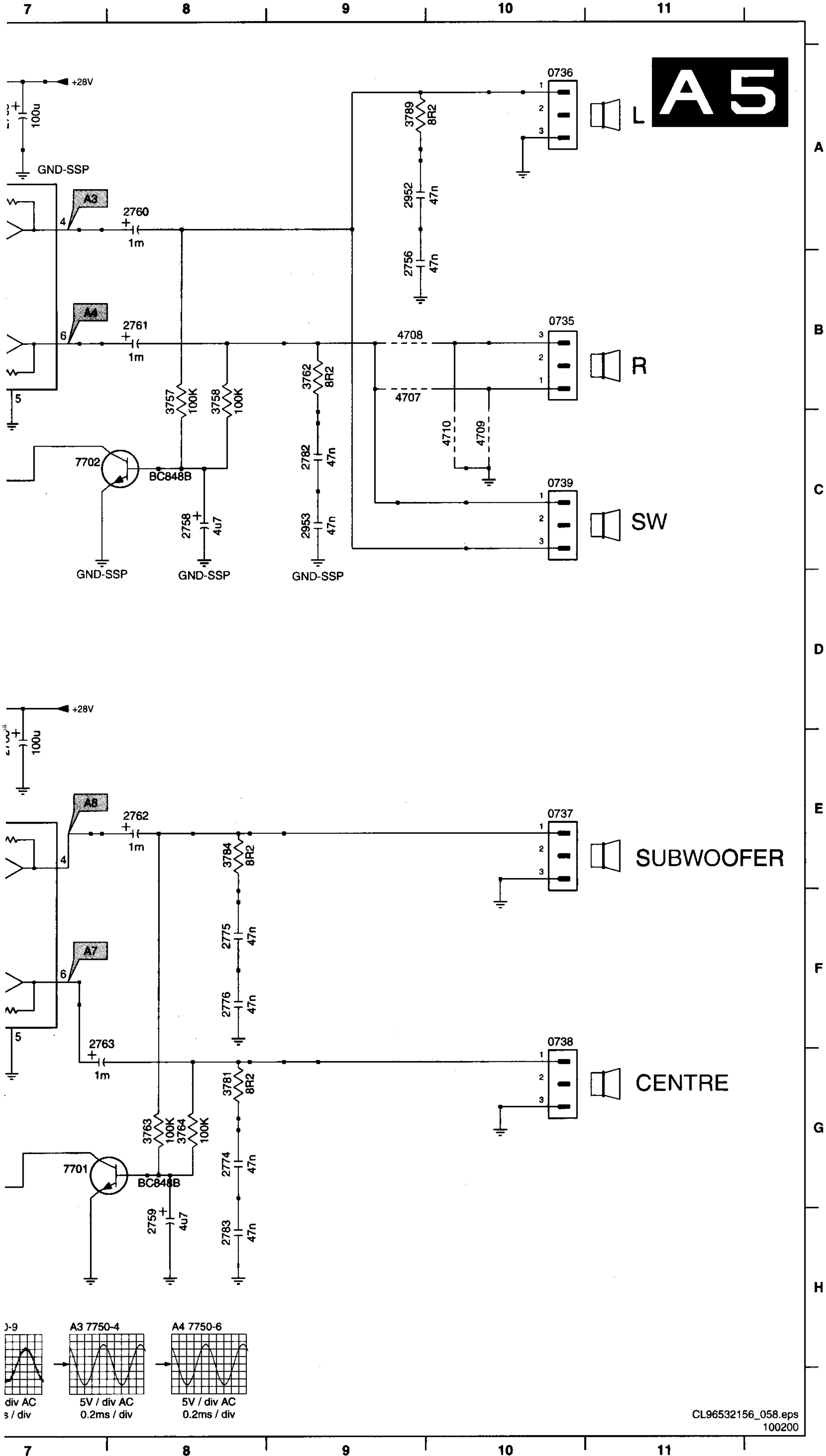
CL96532156_057.eps
030100

| Diversity Large Signal Panel (A4) | | | | | |
|---|---|---|---|---|---|
| PosNr | 29" | 25" | 28" | 28" WS | 32" WS |
| 0390 | - | - | - | - | CON 03P |
| 3602 | 3K3 | 3K3 | 3K3 | - | - |
| 3611 | - | - | - | 8K2 | 8K2 |
| 3614 | 1M | 1M | 1M | 1M2 | 1M2 |
| 3615 | 470K | 560K | 560K | 560K | 560K |
| 3621 | 1R | 1R5 | 1R5 | 1R5 | 1R5 |
| 3622 | 1R | 1R | 1R | 1R8 | 1R8 |
| 6600 | 1N4148 | 1N4148 | 1N4148 | SIGAT85 | SIGAT85 |
| 6621 | ECYD33D | - | - | ECYD33D | ECYD33D |
| 6622 | DIO | - | - | DIO | DIO |
| 7440 | - | - | - | - | LM358N |
| 7441 | - | - | - | - | SIGC547B |
| 7442 | - | - | - | - | SIGC557B |
| 9622 | - | WR | WR | - | - |

| | |
|---|---|
| 0325 | C8 |
| 0390 | D8 |
| 0393 | A4 |
| 2443 | F3 |
| 2444 | E3 |
| 2445 | E3 |
| 2446 | E5 |
| 2447 | F5 |
| 2600 | B2 |
| 2601 | D2 |
| 2602 | D4 |
| 2603 | D5 |
| 2604 | C5 |
| 2605 | D3 |
| 2610 | B4 |
| 2620 | C5 |
| 2621 | D6 |
| 2622 | A6 |
| 2624 | C7 |
| 2625 | C6 |
| 2627 | C7 |
| 2629 | C8 |
| 2640 | C3 |
| 2642 | B7 |
| 2653 | D6 |
| 3402 | A8 |
| 3403 | A9 |
| 3439 | E4 |
| 3440 | F2 |
| 3441 | E3 |
| 3442 | E4 |
| 3443 | E4 |
| 3444 | E4 |
| 3445 | E6 |
| 3446 | F6 |
| 3447 | E6 |
| 3600 | B2 |
| 3601 | B2 |
| 3602 | A2 |
| 3603 | B3 |
| 3605 | D4 |
| 3606 | C4 |
| 3607 | C4 |
| 3608 | C4 |
| 3609 | D5 |
| 3610 | D5 |
| 3611 | A2 |
| 3612 | B4 |
| 3613 | B4 |
| 3614 | B3 |
| 3615 | B4 |
| 3616 | B4 |
| 3617 | B5 |
| 3618 | B3 |
| 3619 | D2 |
| 3620 | D6 |
| 3621 | D7 |
| 3622 | D7 |
| 3623 | D5 |
| 3624 | C7 |
| 3625 | C8 |
| 3626 | C8 |
| 3627 | C8 |
| 3629 | C8 |
| 3630 | E2 |
| 3631 | E2 |
| 3632 | D2 |
| 3633 | B2 |
| 3640 | C2 |
| 3641 | C2 |
| 3642 | B3 |
| 3643 | B3 |
| 3644 | B8 |
| 3645 | A7 |
| 3652 | B8 |
| 3653 | D5 |
| 4610 | C2 |
| 4611 | C2 |
| 5620 | B7 |
| 6405 | A7 |
| 6440 | E4 |
| 6441 | F4 |
| 6442 | B8 |
| 6483 | A7 |
| 6600 | D3 |
| 6616 | B4 |
| 6619 | C7 |
| 6620 | A6 |
| 6621 | A6 |
| 6622 | B6 |
| 6623 | B7 |
| 7407 | A8 |
| 7440-A | E5 |
| 7440-B | E7 |
| 7441 | E6 |
| 7442 | F6 |
| 7600 | B2 |
| 7602 | C4 |
| 7603 | B3 |
| 7605 | E2 |
| 7606 | E3 |
| 7610 | C1 |
| 7611 | C1 |
| 7620 | B6 |
| 7640 | C3 |
| 7641 | B8 |
| 7652 | B9 |
| 9620 | B6 |

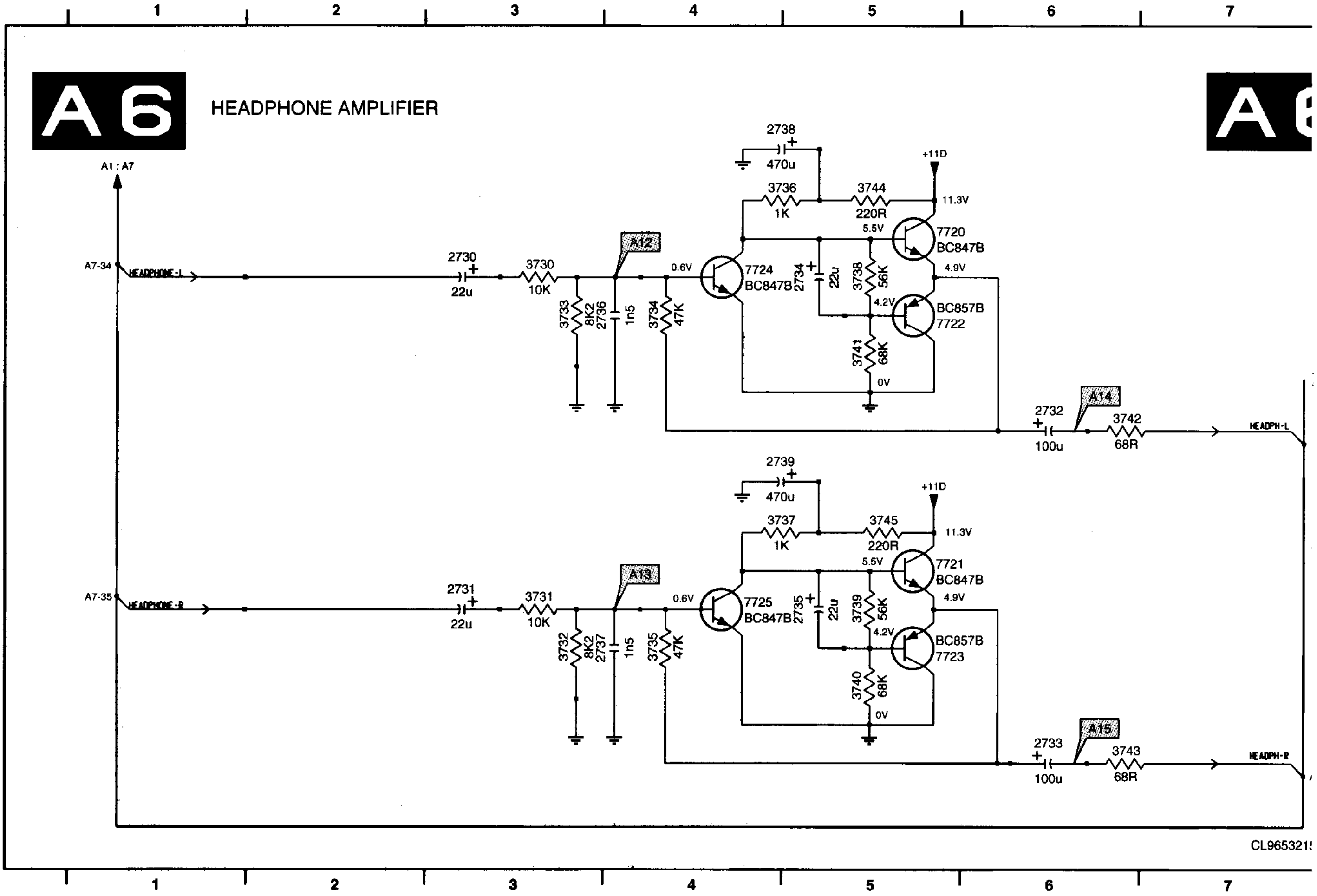
## Audio amplifier


A5
AUDIO AMPLIFIER
A1 : A7
0041
4737
+11D
3752 1K
7711 BC848B
3754 100R
3753 1K
GND-SSP
AUDIO-L
A7-13
2784 680n
3790 1K8
LEFT
2941 1n5
3701 10K
3702 10K
7750
TDA2616
A1
A2
2767 220u
3765 6K8
AUDIO-R
A7-14
2785 680n
3792 1K8
2942 1n5
+28V
3710 1K
3711 10K
6731 BAS216
2704 47u
3714 4K7
BC858B 7731
3715 1K
3716 1K5
7732 BC847B
3717 4K7
3773 15K
3770 47K
3756 10K
7730 BC847B
2951 1u
3718 1K5
7733 BC847B
3719 1K
4722
SOUND-ENABLE
A7-2
7740
TDA2616
A5
A6
AUDIO-SL
A7-33
2786 680n
3798 470R
3703 10K
2946 1n5
4736
3726 68K
2712 100n
7710-A LM833D
3796 470R
3704 10K
2944 1n5
2768 220u
3708 6K8
AUDIO-SW
A6-17
3794 470R
3795 6K8
2943 1n5
2710 680n
2711 680n
3727 68K
3728 680R
3712 4K7
2787 680n
3713 3K9
3721 680R
3725 2K2
7715 BC848B
3722 56K
3723 56K
3724 100R
6730 BAS216
7710-B LM833D
AUDIO-C
A7-18
A1 7750-1
0.2V / div AC
0.2ms / div
A2 7750
0.2V /
0.2m
1
2
3
4
5
6

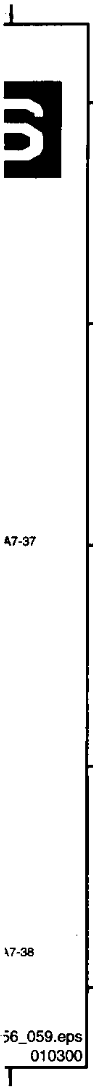

7
8
9
10
11
A5
+28V
100u
GND-SSP
A3
4
2760
1m
A4
6
2761
1m
5
0736
1
2
3
L
3789
8R2
2952
47n
2756
47n
0735
R
4708
4707
3762
8R2
3757
100K
3758
100K
7702
BC848B
4710
4709
2782
47n
2758
4u7
2953
47n
0739
SW
GND-SSP
GND-SSP
GND-SSP
+28V
100u
A8
4
2762
1m
A7
6
5
2763
1m
0737
SUBWOOFER
3784
8R2
2775
47n
2776
47n
0738
CENTRE
3781
8R2
3763
100K
3764
100K
7701
BC848B
2759
4u7
2774
47n
2783
47n
A3 7750-4
A4 7750-6
div AC
s / div
5V / div AC
0.2ms / div
5V / div AC
0.2ms / div
CL96532156_058.eps
100200
A
B
C
D
E
F
G
H

| | |
|---|---|
| 0041 | A5 |
| 0735 | B10 |
| 0736 | A10 |
| 0737 | E10 |
| 0738 | F10 |
| 0739 | C10 |
| 2704 | C3 |
| 2710 | F2 |
| 2711 | F2 |
| 2712 | F4 |
| 2756 | B9 |
| 2758 | C8 |
| 2759 | H8 |
| 2760 | A8 |
| 2761 | B8 |
| 2762 | E8 |
| 2763 | F7 |
| 2765 | A7 |
| 2766 | E7 |
| 2767 | B6 |
| 2768 | G6 |
| 2774 | G8 |
| 2775 | F8 |
| 2776 | F8 |
| 2782 | C9 |
| 2783 | H8 |
| 2784 | A4 |
| 2785 | B4 |
| 2786 | E4 |
| 2787 | G4 |
| 2941 | B6 |
| 2942 | C6 |
| 2943 | G1 |
| 2944 | F6 |
| 2946 | F6 |
| 2951 | D5 |
| 2952 | A9 |
| 2953 | C9 |
| 3701 | B5 |
| 3702 | B5 |
| 3703 | F5 |
| 3704 | F5 |
| 3708 | G7 |
| 3710 | C2 |
| 3711 | C2 |
| 3712 | G2 |
| 3713 | G4 |
| 3714 | C3 |
| 3715 | C5 |
| 3716 | C4 |
| 3717 | D3 |
| 3718 | E3 |
| 3719 | E4 |
| 3721 | G3 |
| 3722 | H3 |
| 3723 | H3 |
| 3724 | H4 |
| 3725 | G4 |
| 3726 | F3 |
| 3727 | F3 |
| 3728 | G2 |
| 3752 | A4 |
| 3753 | B4 |
| 3754 | B3 |
| 3756 | D5 |
| 3757 | B8 |
| 3758 | B8 |
| 3762 | B9 |
| 3763 | G8 |
| 3764 | G8 |
| 3765 | C7 |
| 3770 | D3 |
| 3773 | D3 |
| 3781 | G8 |
| 3784 | E8 |
| 3789 | A9 |
| 3790 | A5 |
| 3792 | B5 |
| 3794 | F1 |
| 3795 | G1 |
| 3796 | F5 |
| 3798 | E5 |
| 4707 | B9 |
| 4708 | B9 |
| 4709 | C10 |
| 4710 | C10 |
| 4722 | E3 |
| 4736 | F2 |
| 4737 | A4 |
| 6730 | H4 |
| 6731 | C3 |
| 7701 | G7 |
| 7702 | C7 |
| 7710-A | F4 |
| 7710-B | H5 |
| 7711 | B4 |
| 7715 | H2 |
| 7730 | D5 |
| 7731 | C3 |
| 7732 | C5 |
| 7733 | E4 |
| 7740 | E6 |
| 7750 | A6 |

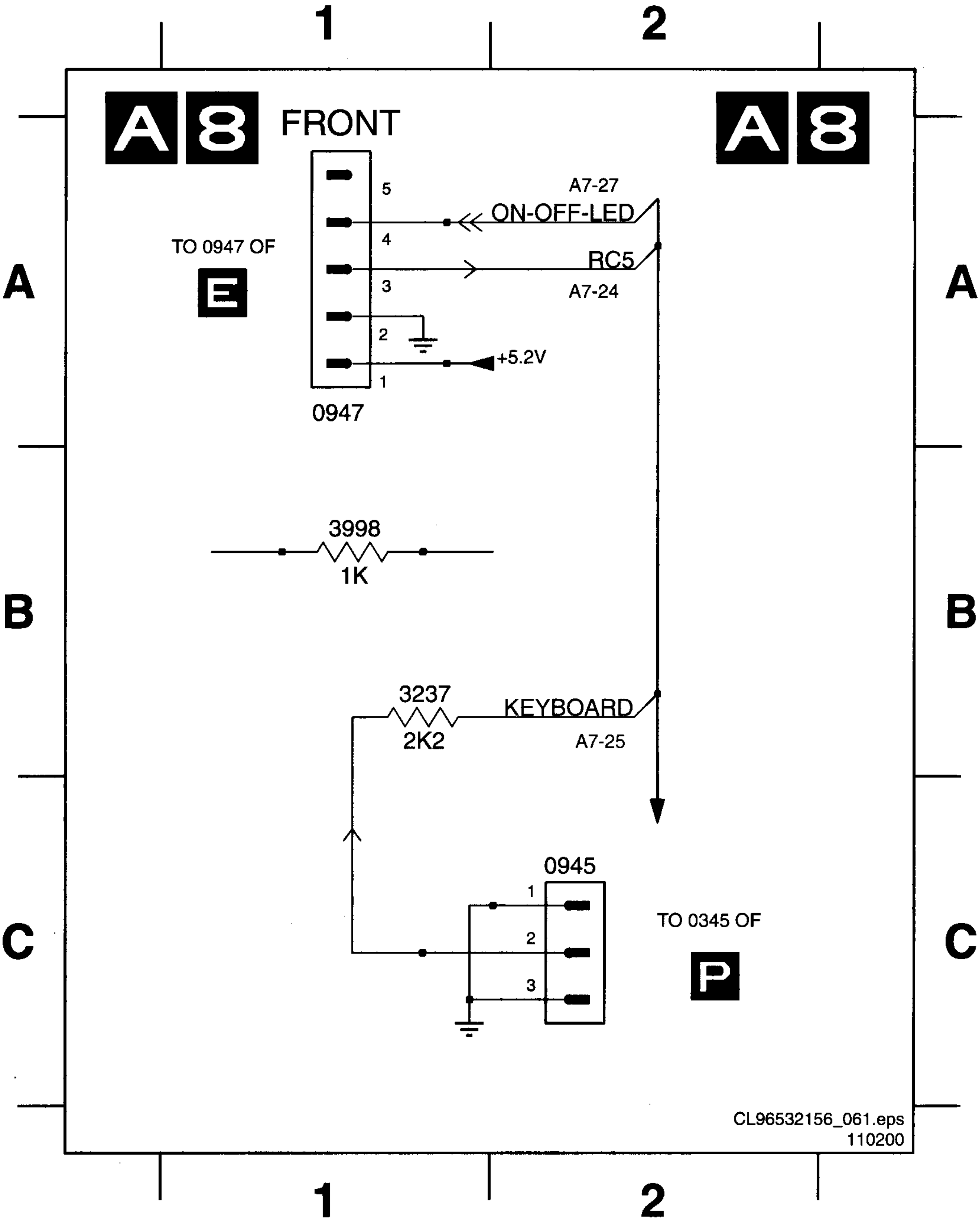
## Headphone amplifier


A6
HEADPHONE AMPLIFIER
A1 : A7
A7-34
HEADPHONE-L
A7-35
HEADPHONE-R
2730
22u
3730
10K
3733
8K2
2736
1n5
3734
47K
A12
0.6V
7724
BC847B
2734
22u
3738
56K
3741
68K
4.2V
0V
2738
470u
3736
1K
3744
220R
+11D
11.3V
5.5V
7720
BC847B
4.9V
BC857B
7722
A14
2732
100u
3742
68R
HEADPH-L
2731
22u
3731
10K
3732
8K2
2737
1n5
3735
47K
A13
0.6V
7725
BC847B
2735
22u
3739
56K
3740
68K
4.2V
0V
2739
470u
3737
1K
3745
220R
+11D
11.3V
5.5V
7721
BC847B
4.9V
BC857B
7723
A15
2733
100u
3743
68R
HEADPH-R
CL965321
1
2
3
4
5
6
7

## Front

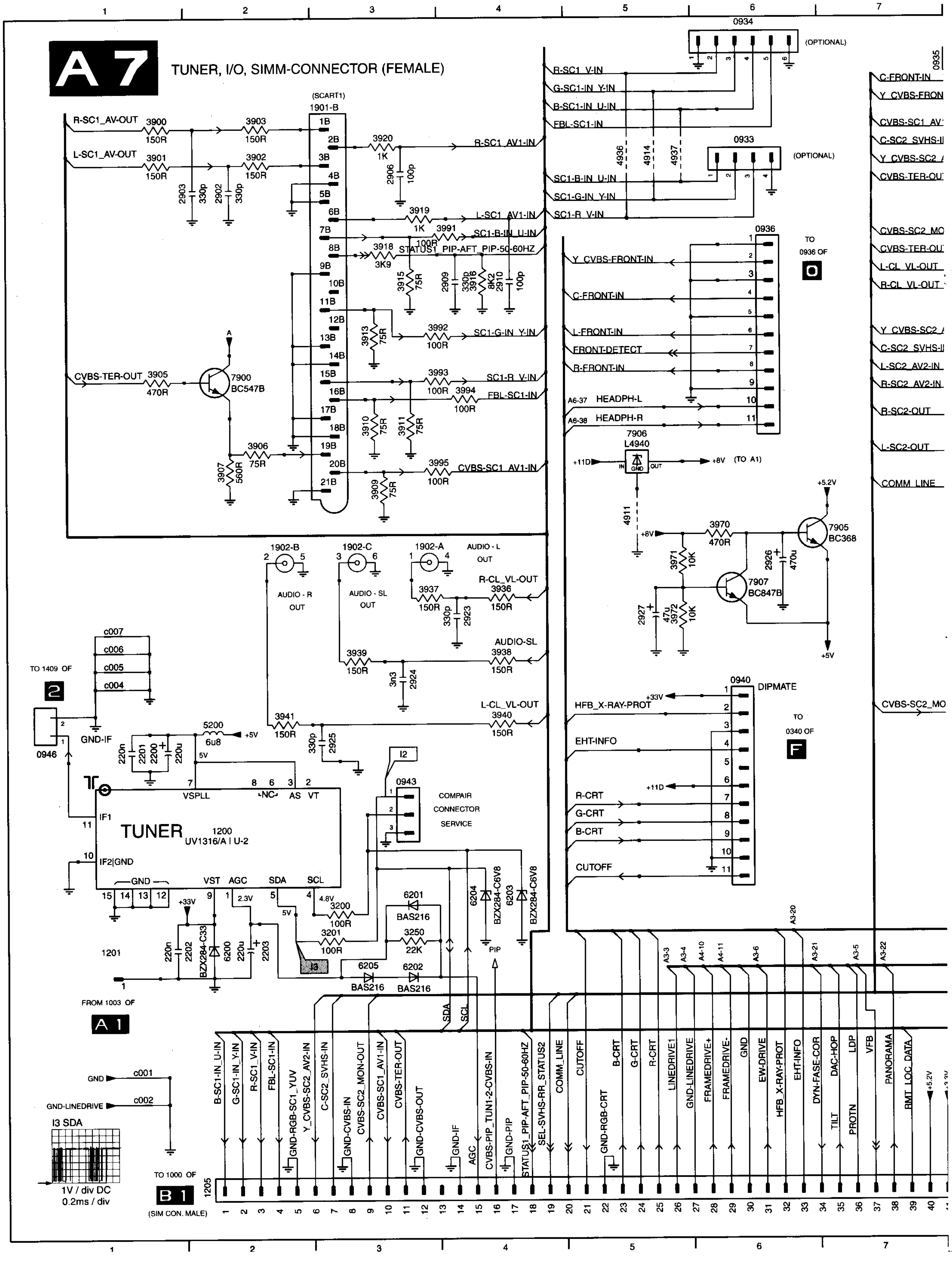

A
B
C
D
A7-37
A7-38
56_059.eps
010300

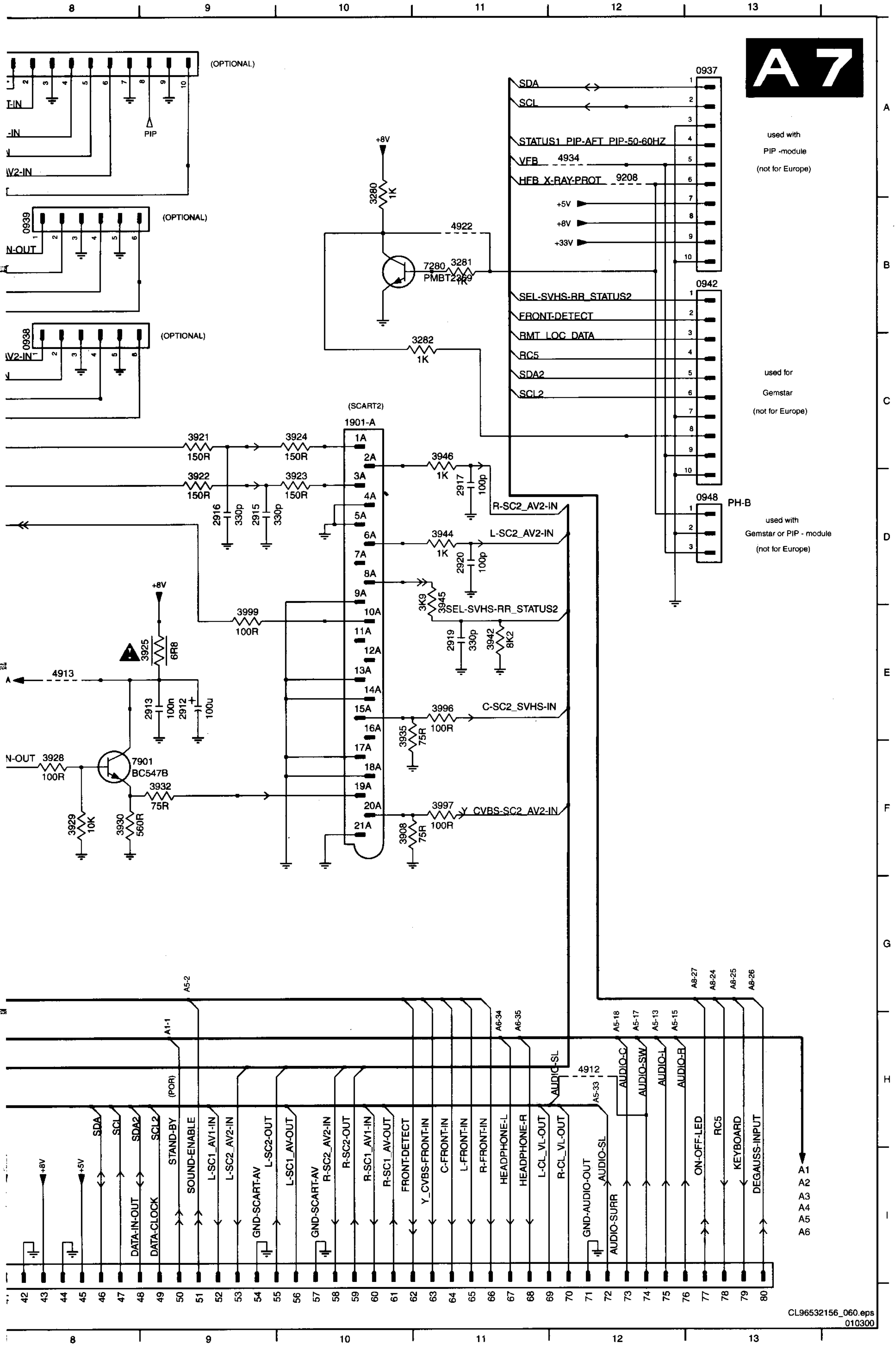
| | |
|---|---|
| 2730 | A3 |
| 2731 | C3 |
| 2732 | B6 |
| 2733 | D6 |
| 2734 | B5 |
| 2735 | C5 |
| 2736 | B4 |
| 2737 | D4 |
| 2738 | A4 |
| 2739 | C4 |
| 3730 | B3 |
| 3731 | C3 |
| 3732 | D3 |
| 3733 | B3 |
| 3734 | B4 |
| 3735 | D4 |
| 3736 | A4 |
| 3737 | C4 |
| 3738 | B5 |
| 3739 | C5 |
| 3740 | D5 |
| 3741 | B5 |
| 3742 | B6 |
| 3743 | D6 |
| 3744 | A5 |
| 3745 | C5 |
| 7720 | A5 |
| 7721 | C5 |
| 7722 | B5 |
| 7723 | D5 |
| 7724 | B4 |
| 7725 | C4 |


1
2
A
B
C
A8
FRONT
A8
TO 0947 OF
E
5
4
3
2
1
0947
A7-27
ON-OFF-LED
RC5
A7-24
+5.2V
3998
1K
3237
2K2
KEYBOARD
A7-25
0945
1
2
3
TO 0345 OF
P
CL96532156_061.eps
110200

| | |
|---|---|
| 0947 | A1 |
| 3237 | B1 |
| 3998 | B1 |

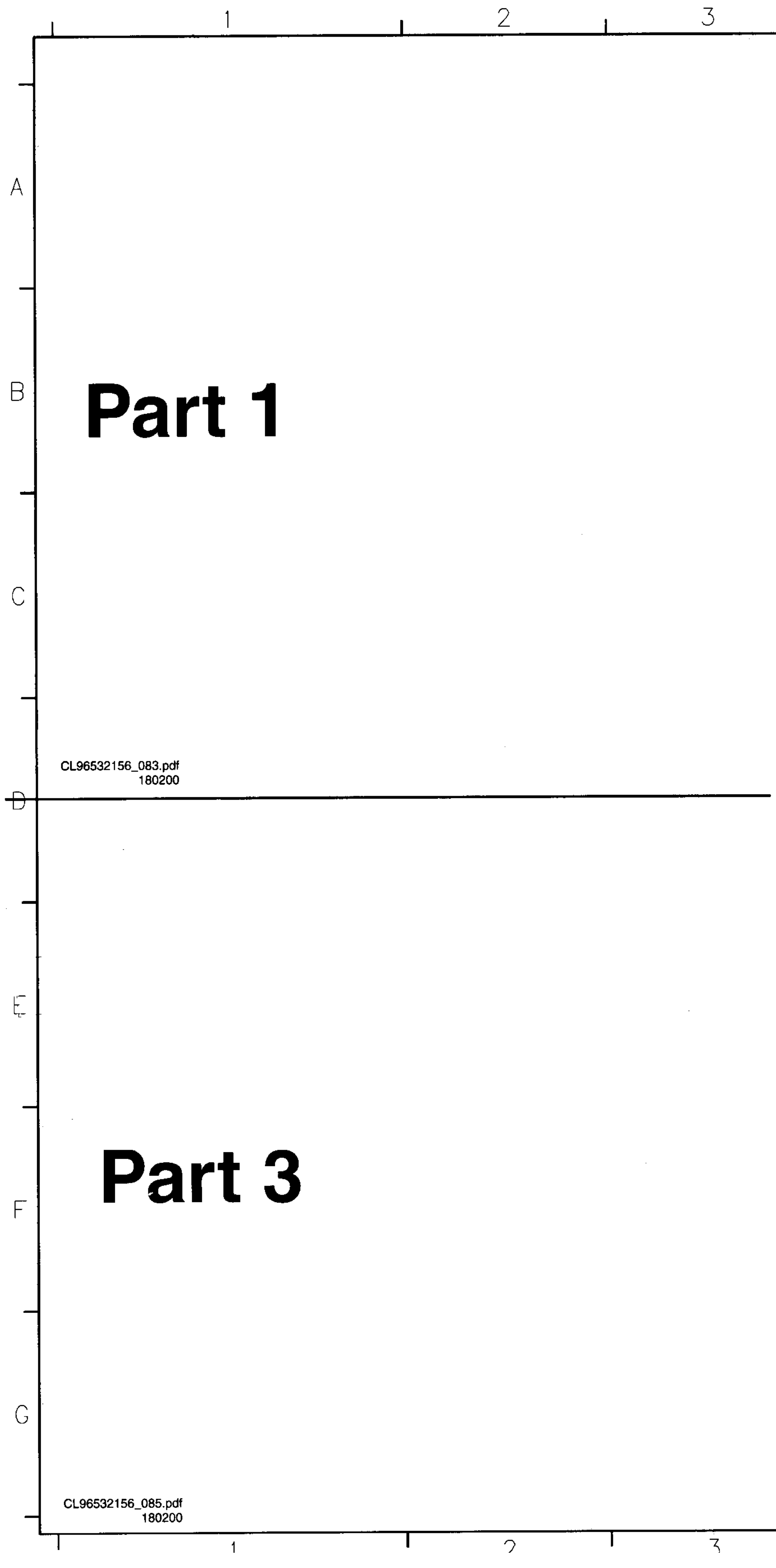
## Tuner, I/O, Simm connector (female)


A 7
TUNER, I/O, SIMM-CONNECTOR (FEMALE)
(SCART1) 1901-B
R-SC1_AV-OUT
L-SC1_AV-OUT
CVBS-TER-OUT
7900 BC547B
R-SC1_AV1-IN
L-SC1_AV1-IN
SC1-B-IN_U-IN
STATUS1_PIP-AFT_PIP-50-60HZ
SC1-G-IN_Y-IN
SC1-R_V-IN
FBL-SC1-IN
CVBS-SC1_AV1-IN
0934 (OPTIONAL)
0933 (OPTIONAL)
R-SC1_V-IN
G-SC1-IN_Y-IN
B-SC1-IN_U-IN
FBL-SC1-IN
0936
TO 0936 OF O
Y_CVBS-FRONT-IN
C-FRONT-IN
L-FRONT-IN
FRONT-DETECT
R-FRONT-IN
HEADPH-L
HEADPH-R
7906 L4940
+11D
+8V (TO A1)
7905 BC368
7907 BC847B
+5.2V
+5V
1902-B AUDIO - R OUT
1902-C AUDIO - SL OUT
1902-A AUDIO - L OUT
R-CL_VL-OUT
AUDIO-SL
L-CL_VL-OUT
0940 DIPMATE
TO 0340 OF F
HFB_X-RAY-PROT
EHT-INFO
R-CRT
G-CRT
B-CRT
CUTOFF
TO 1409 OF 2
0946
GND-IF
TUNER 1200 UV1316/A I U-2
VSPLL
AS
VT
IF1
IF2|GND
GND
VST
AGC
SDA
SCL
0943 COMPAIR CONNECTOR SERVICE
I2
I3
6201 BAS216
6205 BAS216
6202 BAS216
6204 BZX284-C6V8
6203 BZX284-C6V8
6200 BZX284-C33
PIP
1201
FROM 1003 OF A 1
GND
GND-LINEDRIVE
I3 SDA
1V / div DC
0.2ms / div
TO 1000 OF B 1 (SIM CON. MALE)
1205
C-FRONT-IN
Y_CVBS-FRON
CVBS-SC1_AV
C-SC2_SVHS-I
Y_CVBS-SC2_
CVBS-TER-OU
CVBS-SC2_MO
L-CL_VL-OUT
R-CL_VL-OUT
L-SC2_AV2-IN
R-SC2_AV2-IN
R-SC2-OUT
L-SC2-OUT
COMM_LINE
CVBS-SC2_MO
B-SC1-IN_U-IN
G-SC1-IN_Y-IN
R-SC1_V-IN
FBL-SC1-IN
GND-RGB-SC1_YUV
Y_CVBS-SC2_AV2-IN
C-SC2_SVHS-IN
GND-CVBS-IN
CVBS-SC2_MON-OUT
CVBS-SC1_AV1-IN
CVBS-TER-OUT
GND-CVBS-OUT
GND-IF
AGC
CVBS-PIP_TUN1-2-CVBS-IN
GND-PIP
STATUS1_PIP-AFT_PIP-50-60HZ
SEL-SVHS-RR_STATUS2
COMM_LINE
CUTOFF
GND-RGB-CRT
B-CRT
G-CRT
R-CRT
LINEDRIVE1
GND-LINEDRIVE
FRAMEDRIVE+
FRAMEDRIVE-
GND
EW-DRIVE
HFB_X-RAY-PROT
EHT-INFO
DYN-FASE-COR
TILT
DAC-HOP
PROTN
LDP
VFB
PANORAMA
RMT_LOC_DATA
SDA
SCL


A 7
8
9
10
11
12
13
A
B
C
D
E
F
G
H
I
(OPTIONAL)
PIP
0939
0938
N-OUT
V2-IN
0937
SDA
SCL
STATUS1_PIP-AFT_PIP-50-60HZ
VFB
4934
HFB_X-RAY-PROT
9208
+5V
+8V
+33V
used with
PIP -module
(not for Europe)
+8V
3280
1K
4922
7280
PMBT2369
3281
1K
3282
1K
0942
SEL-SVHS-RR_STATUS2
FRONT-DETECT
RMT_LOC_DATA
RC5
SDA2
SCL2
used for
Gemstar
(not for Europe)
0948
PH-B
used with
Gemstar or PIP - module
(not for Europe)
(SCART2)
1901-A
3921
150R
3924
150R
3922
150R
3923
150R
2916
330p
2915
330p
3946
1K
2917
100p
R-SC2_AV2-IN
3944
1K
2920
100p
L-SC2_AV2-IN
3K9
3945
SEL-SVHS-RR_STATUS2
2919
330p
3942
8K2
3999
100R
+8V
3925
6R8
4913
2913
100n
2912
100u
3996
100R
C-SC2_SVHS-IN
3935
75R
N-OUT
3928
100R
7901
BC547B
3932
75R
3997
100R
Y_CVBS-SC2_AV2-IN
3908
75R
3929
10K
3930
560R
1A
2A
3A
4A
5A
6A
7A
8A
9A
10A
11A
12A
13A
14A
15A
16A
17A
18A
19A
20A
21A
A5-2
A1-1
A6-34
A6-35
A5-18
A5-17
A5-13
A5-15
A8-27
A8-24
A8-25
A8-26
AUDIO-SL
4912
A5-33
AUDIO-C
AUDIO-SW
AUDIO-L
AUDIO-R
(POR)
+8V
+5V
SDA
SCL
SDA2
SCL2
DATA-IN-OUT
DATA-CLOCK
STAND-BY
SOUND-ENABLE
L-SC1_AV1-IN
L-SC2_AV2-IN
GND-SCART-AV
L-SC2-OUT
L-SC1_AV-OUT
GND-SCART-AV
R-SC2_AV2-IN
R-SC2-OUT
R-SC1_AV1-IN
R-SC1_AV-OUT
FRONT-DETECT
Y_CVBS-FRONT-IN
C-FRONT-IN
L-FRONT-IN
R-FRONT-IN
HEADPHONE-L
HEADPHONE-R
L-CL_VL-OUT
R-CL_VL-OUT
GND-AUDIO-OUT
AUDIO-SL
AUDIO-SURR
ON-OFF-LED
RC5
KEYBOARD
DEGAUSS-INPUT
A1
A2
A3
A4
A5
A6
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
CL96532156_060.eps
010300

| | |
|---|---|
| 0933 | A6 |
| 0934 | A6 |
| 0935 | A7 |
| 0936 | B6 |
| 0937 | A13 |
| 0938 | C8 |
| 0939 | B8 |
| 0940 | E6 |
| 0942 | B13 |
| 0943 | F3 |
| 0946 | F1 |
| 0948 | D13 |
| 1200 | G2 |
| 1201 | H1 |
| 1205 | I2 |
| 1901-A | C10 |
| 1901-B | A2 |
| 1902-A | D3 |
| 1902-B | D2 |
| 1902-C | D3 |
| 2200 | F1 |
| 2201 | F1 |
| 2202 | H1 |
| 2203 | H2 |
| 2902 | B2 |
| 2903 | B2 |
| 2906 | A3 |
| 2909 | B4 |
| 2910 | B4 |
| 2912 | E9 |
| 2913 | E9 |
| 2915 | D9 |
| 2916 | D9 |
| 2917 | D11 |
| 2919 | E11 |
| 2920 | D11 |
| 2923 | E4 |
| 2924 | E3 |
| 2925 | F3 |
| 2926 | D6 |
| 2927 | E5 |
| 3200 | G3 |
| 3201 | G3 |
| 3250 | G3 |
| 3280 | A10 |
| 3281 | B11 |
| 3282 | C11 |
| 3900 | A1 |
| 3901 | A1 |
| 3902 | A2 |
| 3903 | A2 |
| 3905 | C1 |
| 3906 | D2 |
| 3907 | D2 |
| 3908 | F10 |
| 3909 | D3 |
| 3910 | C3 |
| 3911 | C3 |
| 3913 | C3 |
| 3915 | B3 |
| 3916 | B4 |
| 3918 | B3 |
| 3919 | B3 |
| 3920 | A3 |
| 3921 | C9 |
| 3922 | D9 |
| 3923 | D10 |
| 3924 | C10 |
| 3925 | E9 |
| 3928 | F8 |
| 3929 | F8 |
| 3930 | F8 |
| 3932 | F9 |
| 3935 | E10 |
| 3936 | E4 |
| 3937 | E3 |
| 3938 | E4 |
| 3939 | E3 |
| 3940 | F4 |
| 3941 | F2 |
| 3942 | E11 |
| 3944 | D11 |
| 3945 | D11 |
| 3946 | C11 |
| 3970 | D6 |
| 3971 | D5 |
| 3972 | E5 |
| 3991 | B4 |
| 3992 | C4 |
| 3993 | C4 |
| 3994 | C4 |
| 3995 | D4 |
| 3996 | E11 |
| 3997 | F11 |
| 3999 | E9 |
| 4911 | D5 |
| 4912 | H12 |
| 4913 | E8 |
| 4914 | A5 |
| 4922 | B11 |
| 4934 | A12 |
| 4936 | A5 |
| 4937 | A5 |
| 5200 | F2 |
| 6200 | H2 |
| 6201 | G3 |
| 6202 | H3 |
| 6203 | G4 |
| 6204 | G4 |
| 6205 | H3 |
| 7280 | B11 |
| 7900 | C2 |
| 7901 | F8 |
| 7905 | D7 |
| 7906 | C5 |
| 7907 | E6 |
| 9208 | A12 |
| c001 | I1 |
| c002 | I1 |
| c004 | E1 |
| c005 | E1 |
| c006 | E1 |
| c007 | E1 |

## LSP (copper side overview)



| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0010 | A9 | 2467 | A5 | 2920 | E1 | 3510 | D6 | 3735 | E5 | 4521 | D7 |
| 0020 | C8 | 2468 | A5 | 2923 | F1 | 3511 | D7 | 3736 | D5 | 4522 | D7 |
| 0030 | A7 | 2469 | A4 | 2924 | F1 | 3512 | C7 | 3737 | E5 | 4610 | D1 |
| 0035 | A7 | 2480 | C6 | 2925 | F1 | 3513 | B7 | 3738 | D5 | 4611 | D1 |
| 0040 | D5 | 2488 | C4 | 2926 | E3 | 3514 | C7 | 3739 | E5 | 4701 | F5 |
| 0041 | G5 | 2489 | C1 | 2927 | F3 | 3515 | B6 | 3740 | E5 | 4702 | G5 |
| 0045 | F7 | 2490 | A6 | 2941 | G4 | 3516 | C8 | 3741 | D5 | 4707 | F5 |
| 0317 | B4 | 2491 | D2 | 2942 | G4 | 3518 | C7 | 3742 | F5 | 4708 | F6 |
| 0324 | A6 | 2492 | D4 | 2943 | F5 | 3519 | C7 | 3743 | E5 | 4709 | F6 |
| 0325 | A1 | 2495 | D3 | 2944 | G5 | 3520 | C7 | 3744 | D5 | 4710 | F6 |
| 0390 | D1 | 2498 | B5 | 2946 | G6 | 3521 | A9 | 3745 | E5 | 4722 | F5 |
| 0391 | A2 | 2499 | C5 | 2951 | G5 | 3522 | C7 | 3752 | F5 | 4723 | G6 |
| 0392 | A4 | 2501 | C7 | 2952 | F6 | 3523 | D7 | 3753 | F5 | 4724 | F5 |
| 0393 | C1 | 2502 | C7 | 2953 | F4 | 3524 | C7 | 3754 | F5 | 4736 | F5 |
| 0395 | B1 | 2503 | D7 | 3101 | C9 | 3525 | C7 | 3756 | G5 | 4737 | F5 |
| 0735 | F6 | 2505 | A6 | 3102 | D9 | 3526 | B6 | 3757 | F6 | 4910 | E1 |
| 0736 | F6 | 2507 | B8 | 3103 | D9 | 3527 | D6 | 3758 | F5 | 4911 | F2 |
| 0737 | F7 | 2508 | A7 | 3104 | C9 | 3528 | E8 | 3762 | F4 | 4912 | E4 |
| 0738 | F6 | 2509 | A7 | 3105 | D9 | 3529 | E8 | 3763 | G6 | 4913 | F1 |
| 0739 | F5 | 2510 | B6 | 3106 | E9 | 3530 | D7 | 3764 | F6 | 4914 | E1 |
| 0933 | F1 | 2512 | E6 | 3107 | D9 | 3531 | C7 | 3765 | G5 | 4916 | G1 |
| 0934 | E1 | 2513 | D7 | 3108 | C9 | 3533 | D6 | 3770 | F5 | 4917 | F1 |
| 0935 | F1 | 2514 | D7 | 3110 | C8 | 3535 | E6 | 3773 | F5 | 4919 | E4 |
| 0936 | E4 | 2515 | C6 | 3113 | E9 | 3536 | E6 | 3781 | F6 | 4920 | E1 |
| 0937 | G2 | 2516 | B7 | 3114 | E9 | 3537 | E6 | 3784 | F7 | 4922 | G3 |
| 0938 | F1 | 2517 | A6 | 3117 | D9 | 3538 | E6 | 3789 | F6 | 4923 | E5 |
| 0939 | F2 | 2518 | C7 | 3118 | C9 | 3539 | E6 | 3790 | G4 | 4924 | E5 |
| 0940 | E2 | 2519 | E7 | 3120 | E9 | 3540 | D6 | 3792 | G5 | 4925 | E5 |
| 0942 | G3 | 2520 | C7 | 3123 | E9 | 3541 | E6 | 3794 | F5 | 4926 | F5 |
| 0943 | G1 | 2521 | A6 | 3124 | E9 | 3542 | B6 | 3795 | F5 | 4927 | F5 |
| 0945 | E10 | 2523 | C6 | 3125 | C10 | 3543 | C7 | 3796 | F5 | 4928 | F5 |
| 0946 | G2 | 2528 | E8 | 3126 | C10 | 3544 | B7 | 3798 | G5 | 4929 | G1 |
| 0947 | A10 | 2530 | D7 | 3127 | C9 | 3600 | C1 | 3900 | D1 | 4932 | E1 |
| 0948 | G2 | 2531 | D6 | 3200 | G1 | 3601 | C1 | 3901 | D1 | 4934 | G3 |
| 1001 | A8 | 2535 | E6 | 3201 | G1 | 3602 | B1 | 3902 | D1 | 4935 | E1 |
| 1002 | D8 | 2536 | E7 | 3237 | E9 | 3603 | B1 | 3903 | D1 | 4936 | E1 |
| 1003 | A6 | 2537 | A8 | 3250 | G1 | 3605 | A1 | 3905 | E1 | 4937 | E1 |
| 1200 | G1 | 2538 | B7 | 3280 | G3 | 3606 | B1 | 3906 | E1 | 5101 | E8 |
| 1201 | F1 | 2600 | C1 | 3281 | G3 | 3607 | A1 | 3907 | E1 | 5102 | D9 |
| 1205 | E3 | 2601 | C1 | 3282 | G3 | 3608 | A1 | 3908 | F1 | 5103 | E8 |
| 1501 | B9 | 2602 | B1 | 3401 | B4 | 3609 | A1 | 3909 | F1 | 5104 | D8 |
| 1503 | B7 | 2603 | A1 | 3402 | D3 | 3610 | A1 | 3910 | E1 | 5105 | C8 |
| 1901 | E1 | 2604 | A1 | 3403 | D3 | 3611 | B1 | 3911 | E1 | 5110 | E7 |
| 1902 | F1 | 2605 | C1 | 3404 | D3 | 3612 | B1 | 3913 | E1 | 5115 | E7 |
| 2101 | D9 | 2610 | B1 | 3406 | D4 | 3613 | B1 | 3915 | E1 | 5200 | G2 |
| 2102 | D9 | 2620 | A1 | 3407 | D4 | 3614 | B1 | 3916 | E1 | 5400 | A6 |
| 2103 | D9 | 2621 | A1 | 3409 | C2 | 3615 | B1 | 3918 | E1 | 5401 | B4 |
| 2104 | E8 | 2622 | A1 | 3410 | D4 | 3616 | B1 | 3919 | E1 | 5410 | D2 |
| 2105 | C9 | 2624 | A1 | 3411 | D3 | 3617 | C1 | 3920 | D1 | 5411 | C3 |
| 2106 | C9 | 2625 | A1 | 3414 | D4 | 3618 | B1 | 3921 | D2 | 5421 | B4 |
| 2107 | E9 | 2627 | A1 | 3415 | D4 | 3619 | C1 | 3922 | E2 | 5422 | C6 |
| 2108 | C9 | 2629 | A1 | 3416 | D4 | 3620 | B1 | 3923 | D1 | 5423 | C5 |
| 2109 | E9 | 2640 | B1 | 3417 | C4 | 3621 | B1 | 3924 | D1 | 5424 | C5 |
| 2110 | C9 | 2642 | C2 | 3418 | C6 | 3622 | B1 | 3925 | F1 | 5425 | C5 |
| 2111 | C9 | 2653 | A1 | 3423 | C4 | 3623 | A1 | 3928 | F1 | 5426 | C4 |
| 2113 | E8 | 2704 | G4 | 3425 | C5 | 3624 | A1 | 3929 | F1 | 5430 | B3 |
| 2114 | B9 | 2710 | F5 | 3426 | C5 | 3625 | A1 | 3930 | F1 | 5460 | A3 |
| 2200 | F1 | 2711 | F4 | 3431 | B4 | 3626 | A1 | 3932 | F1 | 5461 | A3 |
| 2201 | G1 | 2712 | F4 | 3439 | C1 | 3627 | B1 | 3935 | F1 | 5462 | C2 |
| 2202 | G1 | 2730 | D4 | 3440 | C1 | 3629 | A1 | 3936 | F1 | 5463 | C2 |
| 2203 | G1 | 2731 | E4 | 3441 | C1 | 3630 | D1 | 3937 | F1 | 5464 | C3 |
| 2400 | B5 | 2732 | E6 | 3442 | C1 | 3631 | D1 | 3938 | F1 | 5465 | C3 |
| 2401 | B4 | 2733 | E6 | 3443 | C1 | 3632 | C1 | 3939 | F1 | 5466 | A5 |
| 2409 | D3 | 2734 | D5 | 3444 | D1 | 3633 | C1 | 3940 | F1 | 5467 | C5 |
| 2412 | D3 | 2735 | E5 | 3445 | C1 | 3640 | B1 | 3941 | F1 | 5503 | B8 |
| 2413 | D3 | 2736 | E5 | 3446 | C1 | 3641 | B1 | 3942 | E1 | 5504 | B8 |
| 2414 | D3 | 2737 | E5 | 3447 | C1 | 3642 | B1 | 3944 | E1 | 5505 | C7 |
| 2415 | D4 | 2738 | D5 | 3450 | A6 | 3643 | B1 | 3945 | E1 | 5506 | D7 |
| 2416 | D3 | 2739 | E5 | 3451 | A5 | 3644 | A1 | 3946 | D1 | 5510 | A6 |
| 2417 | D4 | 2756 | F6 | 3460 | A4 | 3645 | C2 | 3970 | F3 | 5620 | A1 |
| 2418 | C3 | 2758 | F5 | 3461 | A4 | 3652 | C3 | 3971 | F3 | 6103 | D9 |
| 2419 | C5 | 2759 | G6 | 3462 | C2 | 3653 | A1 | 3972 | F3 | 6105 | D9 |
| 2420 | C3 | 2760 | F6 | 3463 | C1 | 3701 | G4 | 3991 | E1 | 6106 | C9 |
| 2421 | B6 | 2761 | F3 | 3464 | C3 | 3702 | G3 | 3992 | E1 | 6107 | E8 |
| 2422 | B6 | 2762 | G6 | 3465 | C2 | 3703 | G6 | 3993 | E1 | 6108 | B9 |
| 2423 | B5 | 2763 | G6 | 3466 | A5 | 3704 | G5 | 3994 | E1 | 6109 | B9 |
| 2425 | C4 | 2765 | G4 | 3467 | A5 | 3708 | G5 | 3995 | E2 | 6111 | E8 |
| 2426 | C4 | 2766 | F7 | 3468 | A4 | 3710 | G4 | 3996 | E2 | 6120 | E9 |
| 2429 | C5 | 2767 | G4 | 3469 | A5 | 3711 | G4 | 3997 | E2 | 6121 | E9 |
| 2430 | C6 | 2768 | G6 | 3475 | A5 | 3712 | F4 | 3998 | E10 | 6122 | E9 |
| 2431 | B4 | 2774 | F6 | 3481 | D6 | 3713 | F4 | 3999 | F2 | 6200 | G1 |
| 2432 | B5 | 2775 | F7 | 3483 | D2 | 3714 | G4 | 4102 | E9 | 6201 | G1 |
| 2433 | B4 | 2776 | F7 | 3484 | D2 | 3715 | G4 | 4103 | E9 | 6202 | G1 |
| 2434 | B5 | 2782 | F4 | 3485 | D2 | 3716 | G4 | 4401 | C1 | 6203 | G1 |
| 2435 | C4 | 2783 | F6 | 3486 | D2 | 3717 | G4 | 4402 | C1 | 6204 | G1 |
| 2443 | C1 | 2784 | G5 | 3487 | D2 | 3718 | G5 | 4403 | A1 | 6205 | G1 |
| 2444 | D1 | 2785 | G5 | 3488 | D1 | 3719 | G6 | 4404 | C6 | 6405 | C2 |
| 2445 | D1 | 2786 | G5 | 3489 | B1 | 3721 | F4 | 4405 | D2 | 6406 | D4 |
| 2446 | C1 | 2787 | F5 | 3490 | D6 | 3722 | F4 | 4406 | A1 | 6407 | D4 |
| 2447 | C1 | 2902 | D1 | 3491 | D1 | 3723 | F4 | 4407 | A1 | 6408 | D4 |
| 2450 | A2 | 2903 | D1 | 3495 | C5 | 3724 | F4 | 4408 | B1 | 6421 | D4 |
| 2455 | D2 | 2906 | D1 | 3499 | C5 | 3725 | F5 | 4409 | C1 | 6422 | D5 |
| 2459 | A5 | 2909 | E1 | 3500 | A8 | 3726 | F4 | 4417 | D4 | 6423 | C4 |
| 2460 | A4 | 2910 | E1 | 3501 | A8 | 3727 | F4 | 4418 | C6 | 6440 | D1 |
| 2461 | A4 | 2912 | F1 | 3502 | A7 | 3728 | F4 | 4441 | D1 | 6441 | D1 |
| 2462 | C1 | 2913 | F1 | 3503 | A9 | 3730 | D5 | 4442 | D3 | 6442 | A1 |
| 2463 | C1 | 2915 | D1 | 3504 | C7 | 3731 | E5 | 4443 | D3 | 6460 | A4 |
| 2464 | C2 | 2916 | D1 | 3507 | D6 | 3732 | E5 | 4444 | D3 | 6461 | A4 |
| 2465 | C2 | 2917 | D1 | 3508 | C7 | 3733 | E5 | 4482 | D2 | 6462 | C1 |
| 2466 | A6 | 2919 | E1 | 3509 | B9 | 3734 | E5 | 4483 | D2 | 6463 | C1 |

| | |
|---|---|
| 6464 | C2 |
| 6465 | C2 |
| 6466 | A5 |
| 6468 | A4 |
| 6480 | C5 |
| 6481 | D6 |
| 6482 | D2 |
| 6483 | C2 |
| 6499 | C5 |
| 6501 | A7 |
| 6502 | A7 |
| 6503 | A7 |
| 6504 | A6 |
| 6505 | C6 |
| 6506 | C7 |
| 6507 | E7 |
| 6508 | C7 |
| 6510 | B6 |
| 6511 | D8 |
| 6512 | D8 |
| 6514 | D6 |
| 6515 | B8 |
| 6516 | D7 |
| 6517 | D6 |
| 6518 | C7 |
| 6520 | E7 |
| 6521 | E6 |
| 6522 | E6 |
| 6600 | C1 |
| 6616 | B1 |
| 6619 | A1 |
| 6620 | A1 |
| 6621 | A1 |
| 6622 | A1 |
| 6623 | B2 |
| 6730 | G4 |
| 6731 | G4 |
| 7100 | C9 |
| 7101 | C9 |
| 7102 | D8 |
| 7103 | E9 |
| 7104 | E9 |
| 7280 | G3 |
| 7407 | D3 |
| 7408 | D3 |
| 7409 | D4 |
| 7421 | D3 |
| 7440 | C1 |
| 7441 | C1 |
| 7442 | C1 |
| 7480 | D5 |
| 7481 | D2 |
| 7482 | D2 |
| 7483 | D2 |
| 7502 | C8 |
| 7504 | C7 |
| 7505 | C8 |
| 7506 | D8 |
| 7510 | E6 |
| 7511 | E6 |
| 7528 | E7 |
| 7529 | D7 |
| 7600 | C1 |
| 7602 | B1 |
| 7603 | B1 |
| 7605 | C1 |
| 7606 | C1 |
| 7610 | D1 |
| 7611 | D1 |
| 7620 | A1 |
| 7640 | B1 |
| 7641 | C2 |
| 7652 | B6 |
| 7701 | G6 |
| 7702 | F4 |
| 7710 | F4 |
| 7711 | F5 |
| 7715 | F4 |
| 7720 | D5 |
| 7721 | E5 |
| 7722 | D5 |
| 7723 | E5 |
| 7724 | D5 |
| 7725 | E5 |
| 7730 | G4 |
| 7731 | G4 |
| 7732 | G4 |
| 7733 | G6 |
| 7740 | G5 |
| 7750 | G4 |
| 7900 | E1 |
| 7901 | F1 |
| 7905 | E3 |
| 7906 | F2 |
| 7907 | F3 |
| 9001 | C9 |
| 9102 | D9 |
| 9110 | E7 |
| 9115 | E7 |
| 9201 | G3 |
| 9202 | F2 |
| 9203 | F5 |
| 9204 | F6 |
| 9205 | F6 |
| 9206 | F5 |
| 9207 | E4 |
| 9208 | G2 |
| 9209 | E4 |
| 9210 | G3 |
| 9211 | G3 |
| 9212 | G2 |
| 9213 | E1 |
| 9214 | E5 |
| 9215 | E4 |
| 9216 | F2 |
| 9217 | E2 |
| 9218 | E1 |
| 9220 | E1 |
| 9221 | G2 |
| 9222 | F6 |
| 9223 | F4 |
| 9224 | F6 |
| 9225 | D1 |
| 9226 | F1 |
| 9227 | F1 |
| 9228 | F1 |
| 9229 | G1 |
| 9230 | E2 |
| 9231 | E2 |
| 9401 | B4 |
| 9402 | B1 |
| 9403 | B1 |
| 9404 | B1 |
| 9408 | C2 |
| 9412 | C3 |
| 9414 | C3 |
| 9418 | B1 |
| 9421 | C2 |
| 9423 | C4 |
| 9424 | D1 |
| 9425 | C5 |
| 9426 | C4 |
| 9428 | C2 |
| 9429 | C4 |
| 9430 | C3 |
| 9431 | A1 |
| 9466 | A5 |
| 9480 | C5 |
| 9501 | B7 |
| 9502 | B7 |
| 9503 | B7 |
| 9504 | B7 |
| 9505 | D8 |
| 9511 | C7 |
| 9512 | C7 |
| 9513 | C7 |
| 9514 | C8 |
| 9515 | E6 |
| 9517 | E7 |
| 9518 | C7 |
| 9519 | C8 |
| 9520 | E6 |
| 9523 | D7 |
| 9524 | D7 |
| 9525 | C7 |
| 9526 | A7 |
| 9620 | A1 |
| 9622 | A1 |
| 9623 | B2 |
| 9624 | B3 |
| 9705 | G7 |
| 9707 | G4 |
| 9712 | F5 |
| 9713 | G4 |
| 9714 | G4 |
| 9715 | G4 |
| 9718 | G4 |
| 9720 | G3 |
| 9721 | G6 |
| 9722 | G4 |
| 9723 | F5 |
| 9906 | D6 |
| 9907 | E3 |
| 9908 | E3 |
| 9909 | E2 |
| 9910 | E2 |
| 9911 | E2 |
| 9912 | E2 |
| 9913 | E2 |
| 9914 | E3 |
| 9915 | E3 |
| 9916 | E3 |
| 9917 | E3 |
| 9918 | E3 |
| 9919 | E3 |
| 9922 | E2 |
| 9925 | F2 |
| 9926 | F2 |
| 9927 | F3 |
| 9928 | F3 |
| 9929 | F3 |
| 9930 | E1 |
| 9931 | G1 |
| 9932 | E2 |
| 9933 | E3 |
| 9934 | F3 |
| 9935 | F2 |
| 9936 | E4 |
| 9943 | E3 |
| 9944 | E4 |
| 9945 | E5 |
| 9946 | F3 |
| 9947 | E5 |
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| 9958 | E5 |
| 9960 | E3 |
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| 9962 | F3 |
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| 9964 | F5 |
| 9965 | F2 |
| 9966 | F5 |
| 9967 | D5 |
| 9968 | D6 |
| 9969 | F3 |
| 9970 | F2 |
| 9971 | F2 |
| 9972 | G1 |
| 9976 | D1 |
| 9980 | E2 |
| 9981 | F1 |
| 9982 | F1 |
| 9983 | F1 |
| 9984 | F2 |
| 9985 | G2 |
| 9987 | F2 |
| 9988 | F2 |
| 9989 | E3 |
| 9990 | E2 |
| 9991 | F4 |
| 9992 | F4 |
| 9993 | F2 |
| 9994 | F2 |
| 9995 | F2 |
| 9996 | F3 |
| 9997 | G2 |
| 9998 | G3 |
| 9999 | F4 |

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030300

# Part 2

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180200

# Part 4

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180200

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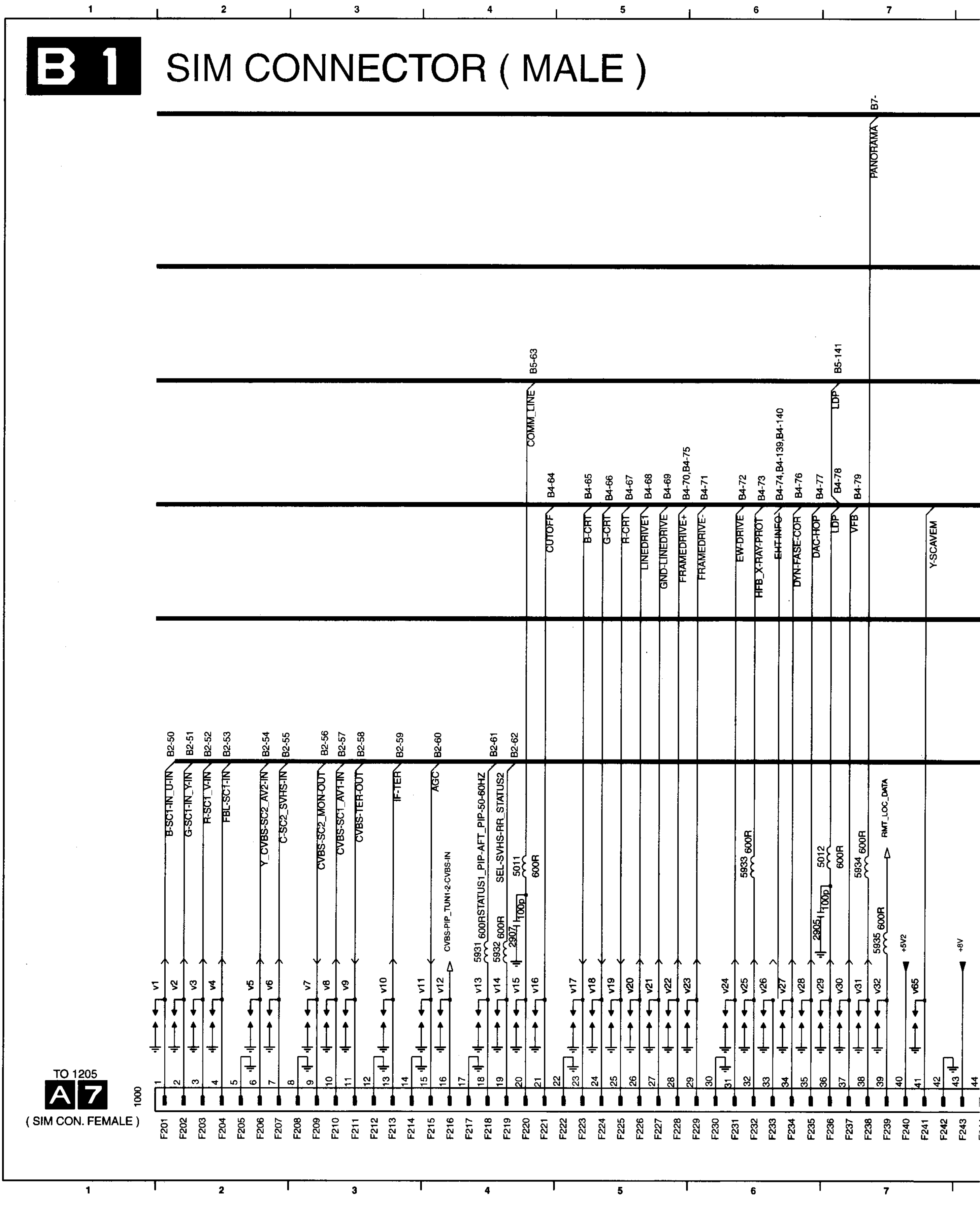
030300

## Sim connector (male)

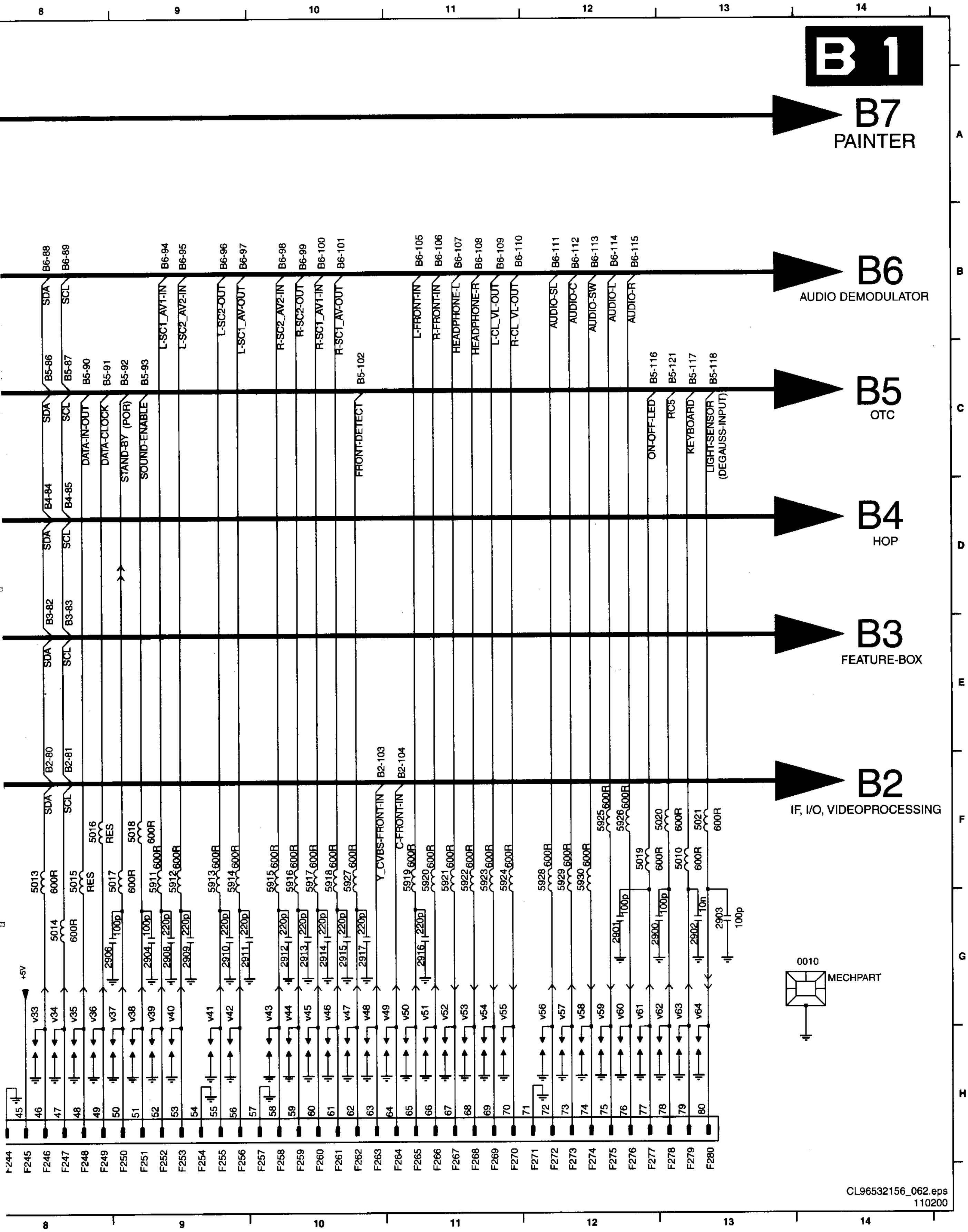
| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| v5 G2 | v9 G3 | v13 G4 | v17 G5 | v21 G5 | v25 G6 | v29 G7 | v33 G8 | v37 G9 | v41 G9 | v45 G10 | v49 G11 | v53 G11 | v57 G12 | v61 G12 | v65 G7 |
| v6 G2 | v10 G3 | v14 G4 | v18 G5 | v22 G5 | v26 G6 | v30 G7 | v34 G8 | v38 G9 | v42 G9 | v46 G10 | v50 G11 | v54 G11 | v58 G12 | v62 G13 | 0010 G14 |
| v7 G3 | v11 G4 | v15 G4 | v19 G5 | v23 G6 | v27 G6 | v31 G7 | v35 G8 | v39 G9 | v43 G10 | v47 G10 | v51 G11 | v55 G11 | v59 G12 | v63 G13 | 1000 H1 |
| v8 G3 | v12 G4 | v16 G4 | v20 G5 | v24 G6 | v28 G6 | v32 G7 | v36 G8 | v40 G9 | v44 G10 | v48 G10 | v52 G11 | v56 G12 | v60 G12 | v64 G13 | 2900 G12 |

# B 1 SIM CONNECTOR ( MALE )



1 2 3 4 5 6 7
B7-
PANORAMA
B5-63
COMM_LINE
B5-141
LDP
B4-64 B4-65 B4-66 B4-67 B4-68 B4-69 B4-70,B4-75 B4-71 B4-72 B4-73 B4-74,B4-139,B4-140 B4-76 B4-77 B4-78 B4-79
CUTOFF
B-CRT
G-CRT
R-CRT
LINEDRIVE1
GND-LINEDRIVE
FRAMEDRIVE+
FRAMEDRIVE-
EW-DRIVE
HFB_X-RAY-PROT
EHT-INFO
DYN-FASE-COR
DAC-HOP
LDP
VFB
Y-SCAVEM
B2-50 B2-51 B2-52 B2-53 B2-54 B2-55 B2-56 B2-57 B2-58 B2-59 B2-60 B2-61 B2-62
B-SC1-IN_U-IN
G-SC1-IN_Y-IN
R-SC1_V-IN
FBL-SC1-IN
Y_CVBS-SC2_AV2-IN
C-SC2_SVHS-IN
CVBS-SC2_MON-OUT
CVBS-SC1_AV1-IN
CVBS-TER-OUT
IF-TER
AGC
CVBS-PIP_TUN1-2-CVBS-IN
5931 600R
STATUS1_PIP-AFT_PIP-50-60HZ
5932 600R
SEL-SVHS-RR_STATUS2
2907 100p
5011 600R
5933 600R
5012 600R
2905 100p
5934 600R
5935 600R
RMT_LOC_DATA
+5V2
+8V
v1 v2 v3 v4 v5 v6 v7 v8 v9 v10 v11 v12 v13 v14 v15 v16 v17 v18 v19 v20 v21 v22 v23 v24 v25 v26 v27 v28 v29 v30 v31 v32 v65
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44
1000
F201 F202 F203 F204 F205 F206 F207 F208 F209 F210 F211 F212 F213 F214 F215 F216 F217 F218 F219 F220 F221 F222 F223 F224 F225 F226 F227 F228 F229 F230 F231 F232 F233 F234 F235 F236 F237 F238 F239 F240 F241 F242 F243
TO 1205
A 7
( SIM CON. FEMALE )

| | |
|---|---|
| 2901 | G12 |
| 2902 | G13 |
| 2903 | G13 |
| 2904 | G9 |
| 2905 | G6 |
| 2906 | G8 |
| 2907 | G4 |
| 2908 | G9 |
| 2909 | G9 |
| 2910 | G9 |
| 2911 | G9 |
| 2912 | G10 |
| 2913 | G10 |
| 2914 | G10 |
| 2915 | G10 |
| 2916 | G11 |
| 2917 | G10 |
| 5010 | F13 |
| 5011 | F4 |
| 5012 | F7 |
| 5013 | F8 |
| 5014 | G8 |
| 5015 | F8 |
| 5016 | F8 |
| 5017 | F9 |
| 5018 | F9 |
| 5019 | F12 |
| 5020 | F13 |
| 5021 | F13 |
| 5911 | F9 |
| 5912 | F9 |
| 5913 | F9 |
| 5914 | F9 |
| 5915 | F10 |
| 5916 | F10 |
| 5917 | F10 |
| 5918 | F10 |
| 5919 | F11 |
| 5920 | F11 |
| 5921 | F11 |
| 5922 | F11 |
| 5923 | F11 |
| 5924 | F11 |
| 5925 | F12 |
| 5926 | F12 |
| 5927 | F10 |
| 5928 | F12 |
| 5929 | F12 |
| 5930 | F12 |
| 5931 | G4 |
| 5932 | G4 |
| 5933 | F6 |
| 5934 | F7 |
| 5935 | G7 |

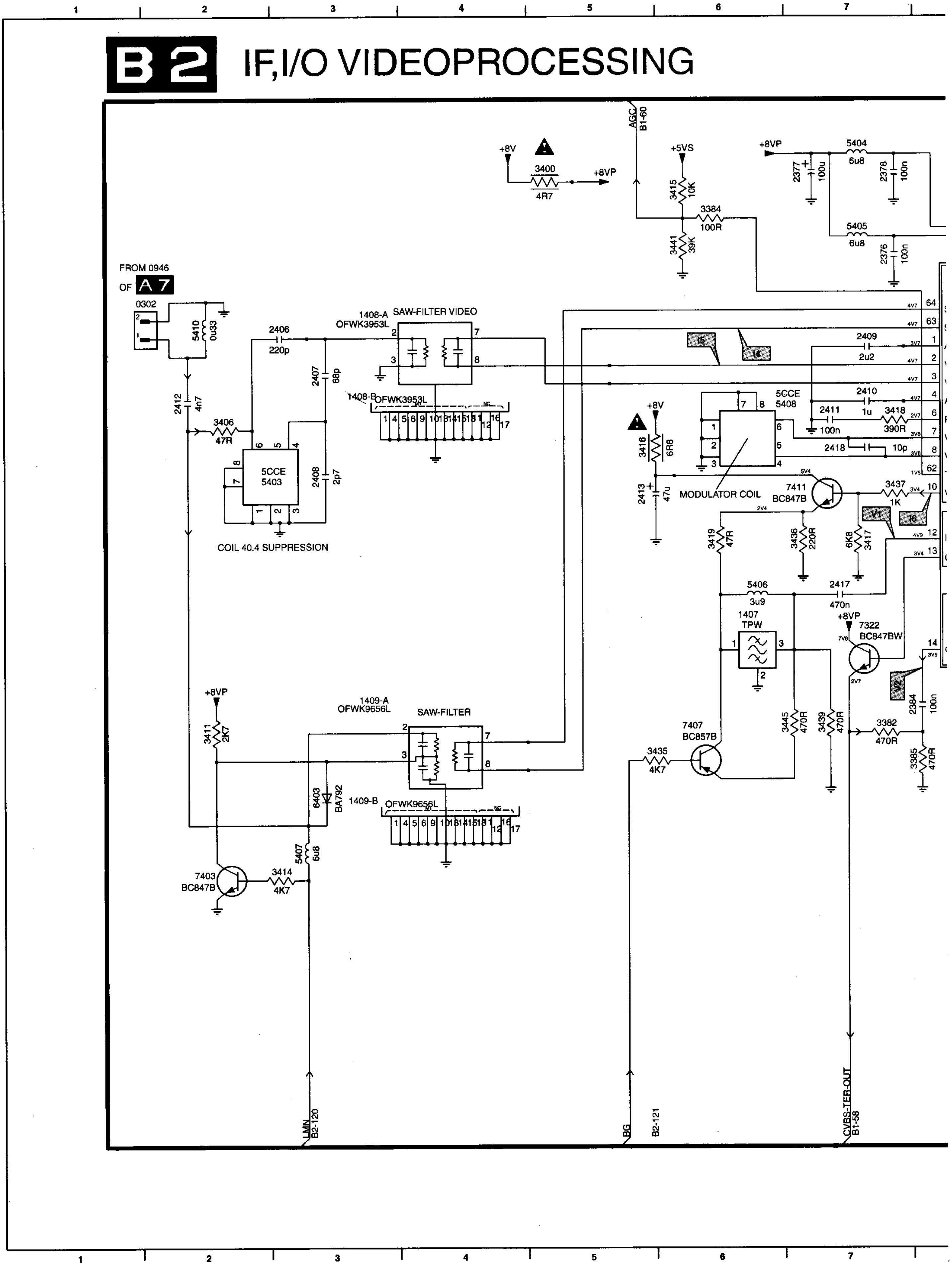


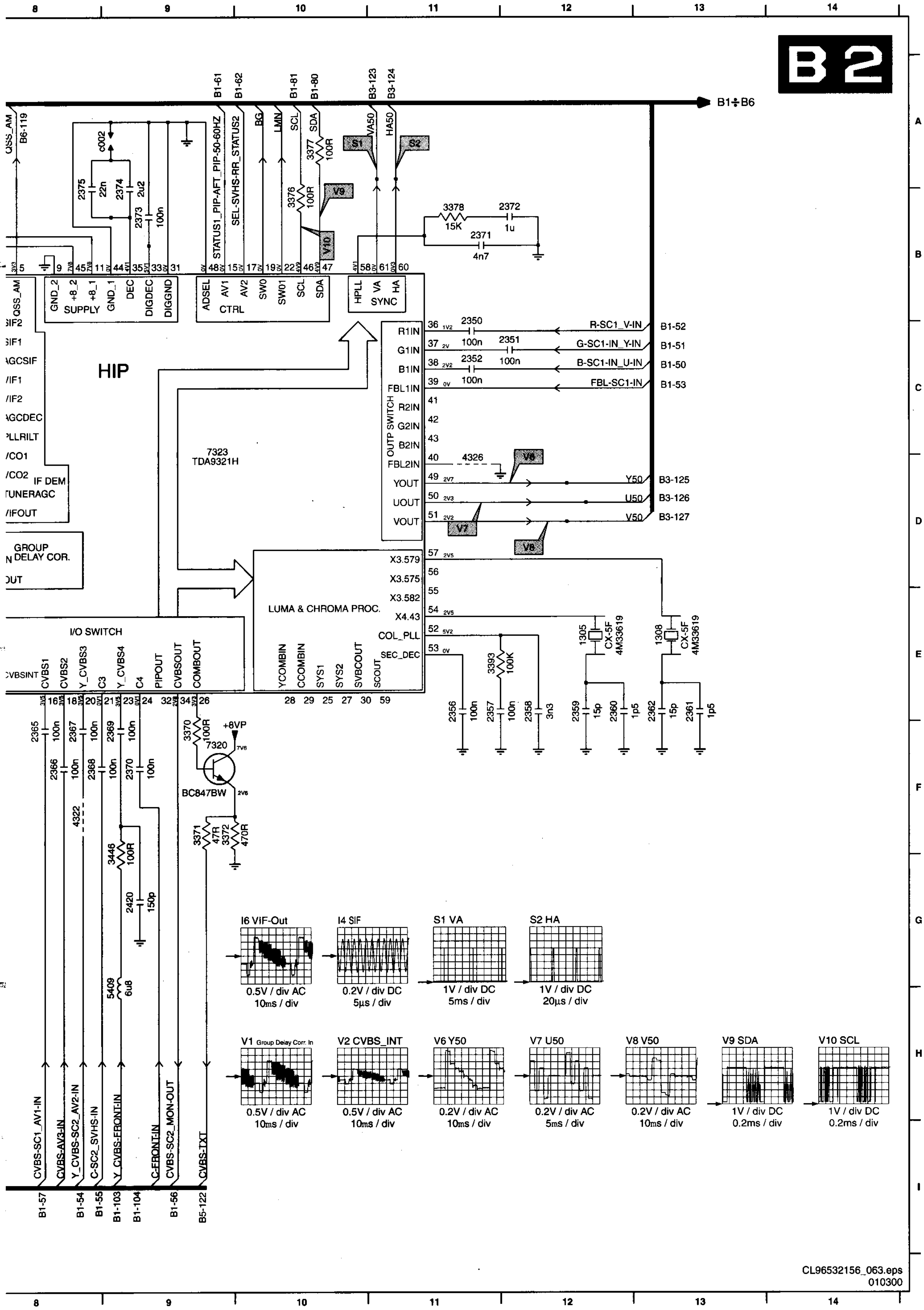
B 1
B7
PAINTER
B6
AUDIO DEMODULATOR
B5
OTC
B4
HOP
B3
FEATURE-BOX
B2
IF, I/O, VIDEOPROCESSING
SDA
SCL
DATA-IN-OUT
DATA-CLOCK
STAND-BY (POR)
SOUND-ENABLE
L-SC1_AV1-IN
L-SC2_AV2-IN
L-SC2-OUT
L-SC1_AV-OUT
R-SC2_AV2-IN
R-SC2-OUT
R-SC1_AV1-IN
R-SC1_AV-OUT
FRONT-DETECT
Y_CVBS-FRONT-IN
C-FRONT-IN
L-FRONT-IN
R-FRONT-IN
HEADPHONE-L
HEADPHONE-R
L-CL_VL-OUT
R-CL_VL-OUT
AUDIO-SL
AUDIO-C
AUDIO-SW
AUDIO-L
AUDIO-R
ON-OFF-LED
RC5
KEYBOARD
LIGHT-SENSOR (DEGAUSS-INPUT)
0010
MECHPART
+5V
A
B
C
D
E
F
G
H
8
9
10
11
12
13
14

CL96532156_062.eps
110200

## IF, I/O videoprocessing

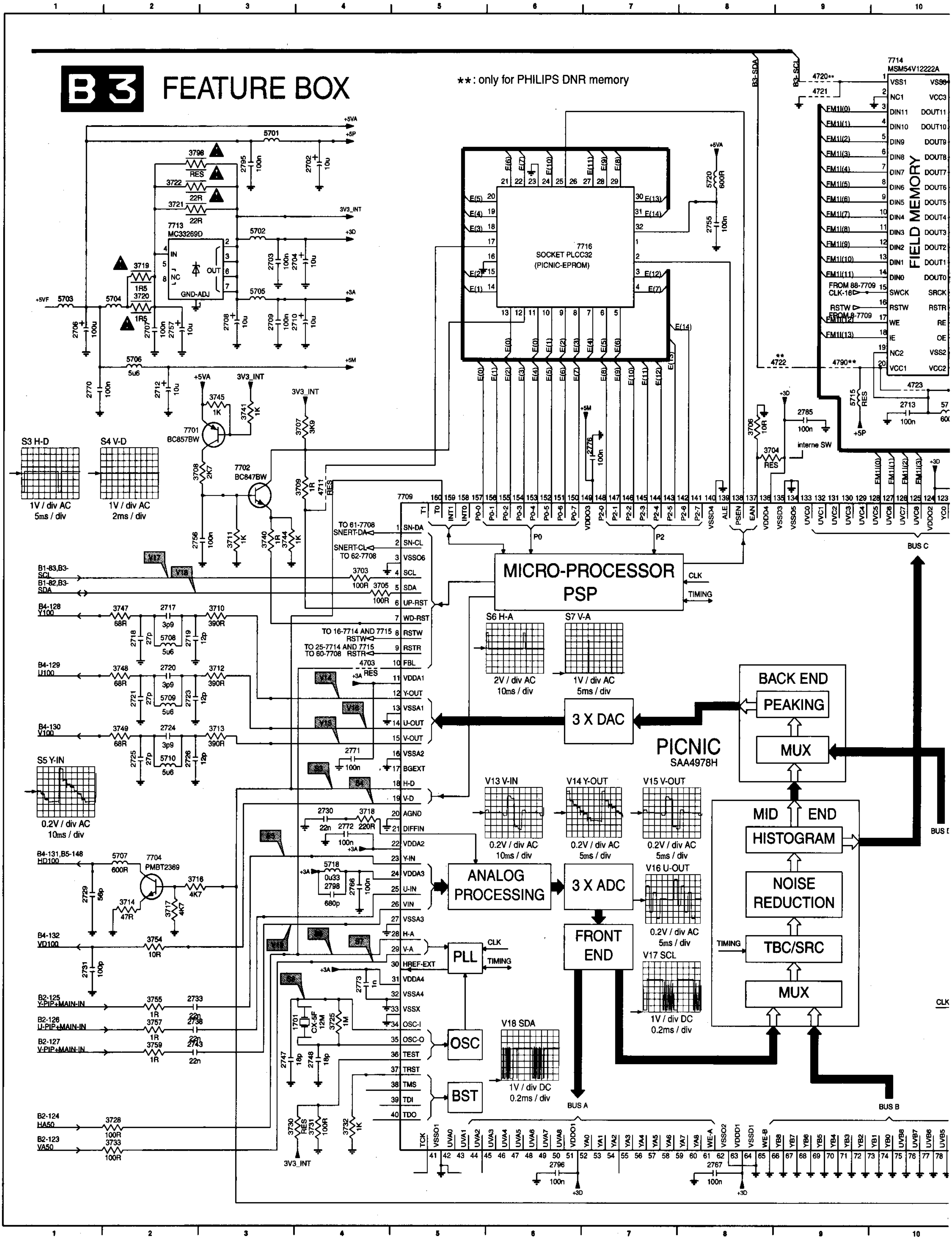
# B2 IF,I/O VIDEOPROCESSING

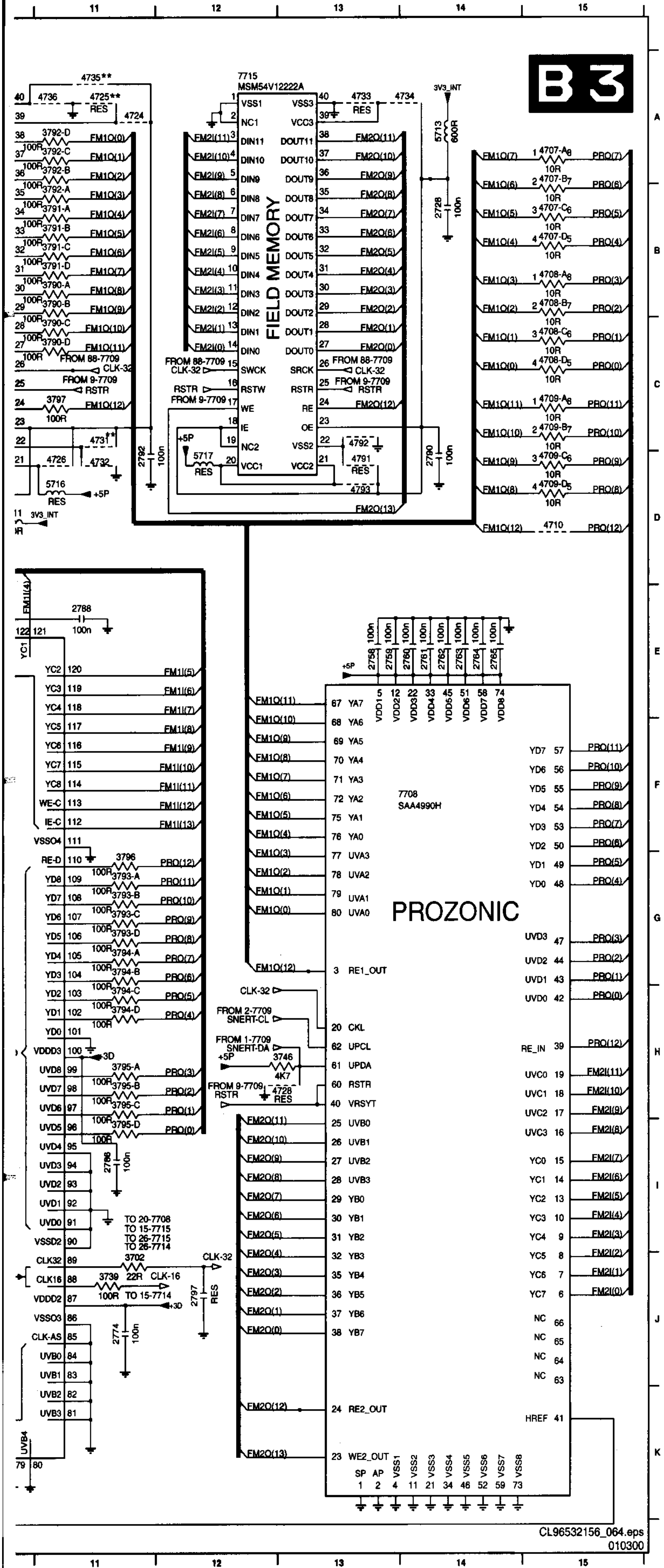

1
2
3
4
5
6
7
AGC
B1-60
+8V
3400
4R7
+8VP
+5VS
3415
10K
3384
100R
3441
39K
+8VP
2377
100u
5404
6u8
2378
100n
5405
6u8
2376
100n
FROM 0946
OF A 7
0302
5410
0u33
2406
220p
1408-A
OFWK3953L
SAW-FILTER VIDEO
2407
68p
1408-B
OFWK3953L
2412
4n7
3406
47R
5CCE
5403
2408
2p7
COIL 40.4 SUPPRESSION
I5
I4
2409
2u2
5CCE
5408
2410
1u
2411
100n
3418
390R
2418
10p
+8V
3416
6R8
2413
47u
MODULATOR COIL
7411
BC847B
3437
1K
V1
I6
3419
47R
3436
220R
6K8
3417
5406
3u9
2417
470n
1407
TPW
+8VP
7322
BC847BW
V2
2384
100n
3382
470R
3385
470R
3445
470R
3439
470R
7407
BC857B
3435
4K7
+8VP
3411
2K7
1409-A
OFWK9656L
SAW-FILTER
6403
BA792
1409-B
OFWK9656L
5407
6u8
7403
BC847B
3414
4K7
LMN
B2-120
BG
B2-121
CVBS-TER-OUT
B1-58
64
63
1
2
3
4
6
7
8
62
10
12
13
14


B2
B1÷B6
HIP
7323
TDA9321H
SUPPLY
CTRL
SYNC
OUTP SWITCH
LUMA & CHROMA PROC.
I/O SWITCH
GROUP DELAY COR.
IF DEM
STATUS1_PIP-AFT_PIP-50-60HZ
SEL-SVHS-RR_STATUS2
BG
LMN
SCL
SDA
VA50
HA50
S1
S2
V6
V7
V8
V9
V10
R-SC1_V-IN
G-SC1-IN_Y-IN
B-SC1-IN_U-IN
FBL-SC1-IN
B1-52
B1-51
B1-50
B1-53
Y50
U50
V50
B3-125
B3-126
B3-127
B1-61
B1-62
B1-81
B1-80
B3-123
B3-124
B6-119
3378 15K
2372 1u
2371 4n7
3376 100R
3377 100R
2350 100n
2351 100n
2352 100n
4326
1305 CX-5F 4M33619
1308 CX-5F 4M33619
2356 100n
2357 100n
3393 100K
2358 3n3
2359 15p
2360 1p5
2362 15p
2361 1p5
+8VP
7320
BC847BW
3370 100R
3371 47R
3372 470R
2365 100n
2366 100n
2367 100n
2368 100n
2369 100n
2370 100n
4322
3446 100R
2420 150p
5409 6u8
2375 22n
2374 2u2
2373 100n
c002
CVBS-SC1_AV1-IN
CVBS-AV3-IN
Y_CVBS-SC2_AV2-IN
C-SC2_SVHS-IN
Y_CVBS-FRONT-IN
C-FRONT-IN
CVBS-SC2_MON-OUT
CVBS-TXT
B1-57
B1-54
B1-55
B1-103
B1-104
B1-56
B5-122
I6 VIF-Out 0.5V / div AC 10ms / div
I4 SIF 0.2V / div DC 5µs / div
S1 VA 1V / div DC 5ms / div
S2 HA 1V / div DC 20µs / div
V1 Group Delay Corr. In 0.5V / div AC 10ms / div
V2 CVBS_INT 0.5V / div AC 10ms / div
V6 Y50 0.2V / div AC 10ms / div
V7 U50 0.2V / div AC 5ms / div
V8 V50 0.2V / div AC 10ms / div
V9 SDA 1V / div DC 0.2ms / div
V10 SCL 1V / div DC 0.2ms / div
CL96532156_063.eps
010300

| | |
|---|---|
| 0302 | B1 |
| 1305 | E12 |
| 1308 | E13 |
| 1407 | E6 |
| 1408-A | B3 |
| 1408-B | C3 |
| 1409-A | E3 |
| 1409-B | F3 |
| 2350 | C11 |
| 2351 | C12 |
| 2352 | C11 |
| 2356 | E11 |
| 2357 | E11 |
| 2358 | E12 |
| 2359 | E12 |
| 2360 | E12 |
| 2361 | E13 |
| 2362 | E13 |
| 2365 | F8 |
| 2366 | F8 |
| 2367 | F8 |
| 2368 | F8 |
| 2369 | F9 |
| 2370 | F9 |
| 2371 | B11 |
| 2372 | B12 |
| 2373 | B9 |
| 2374 | A9 |
| 2375 | A8 |
| 2376 | B7 |
| 2377 | A7 |
| 2378 | A7 |
| 2384 | F8 |
| 2406 | C3 |
| 2407 | C3 |
| 2408 | D3 |
| 2409 | C7 |
| 2410 | C7 |
| 2411 | C7 |
| 2412 | C2 |
| 2413 | D5 |
| 2417 | E7 |
| 2418 | D7 |
| 2420 | G9 |
| 3370 | F9 |
| 3371 | F9 |
| 3372 | F9 |
| 3376 | B10 |
| 3377 | A10 |
| 3378 | B11 |
| 3382 | F7 |
| 3384 | B6 |
| 3385 | F8 |
| 3393 | E11 |
| 3400 | A5 |
| 3406 | C2 |
| 3411 | F2 |
| 3414 | G3 |
| 3415 | B6 |
| 3416 | D5 |
| 3417 | D7 |
| 3418 | C7 |
| 3419 | D6 |
| 3435 | F6 |
| 3436 | D7 |
| 3437 | D7 |
| 3439 | F7 |
| 3441 | B6 |
| 3445 | F7 |
| 3446 | F9 |
| 4322 | F8 |
| 4326 | D11 |
| 5403 | D2 |
| 5404 | A7 |
| 5405 | B7 |
| 5406 | E6 |
| 5407 | G3 |
| 5408 | C6 |
| 5409 | G9 |
| 5410 | C2 |
| 6403 | F3 |
| 7320 | F9 |
| 7322 | E7 |
| 7323 | C9 |
| 7403 | G2 |
| 7407 | F6 |
| 7411 | D7 |
| c002 | A9 |

## Feature box

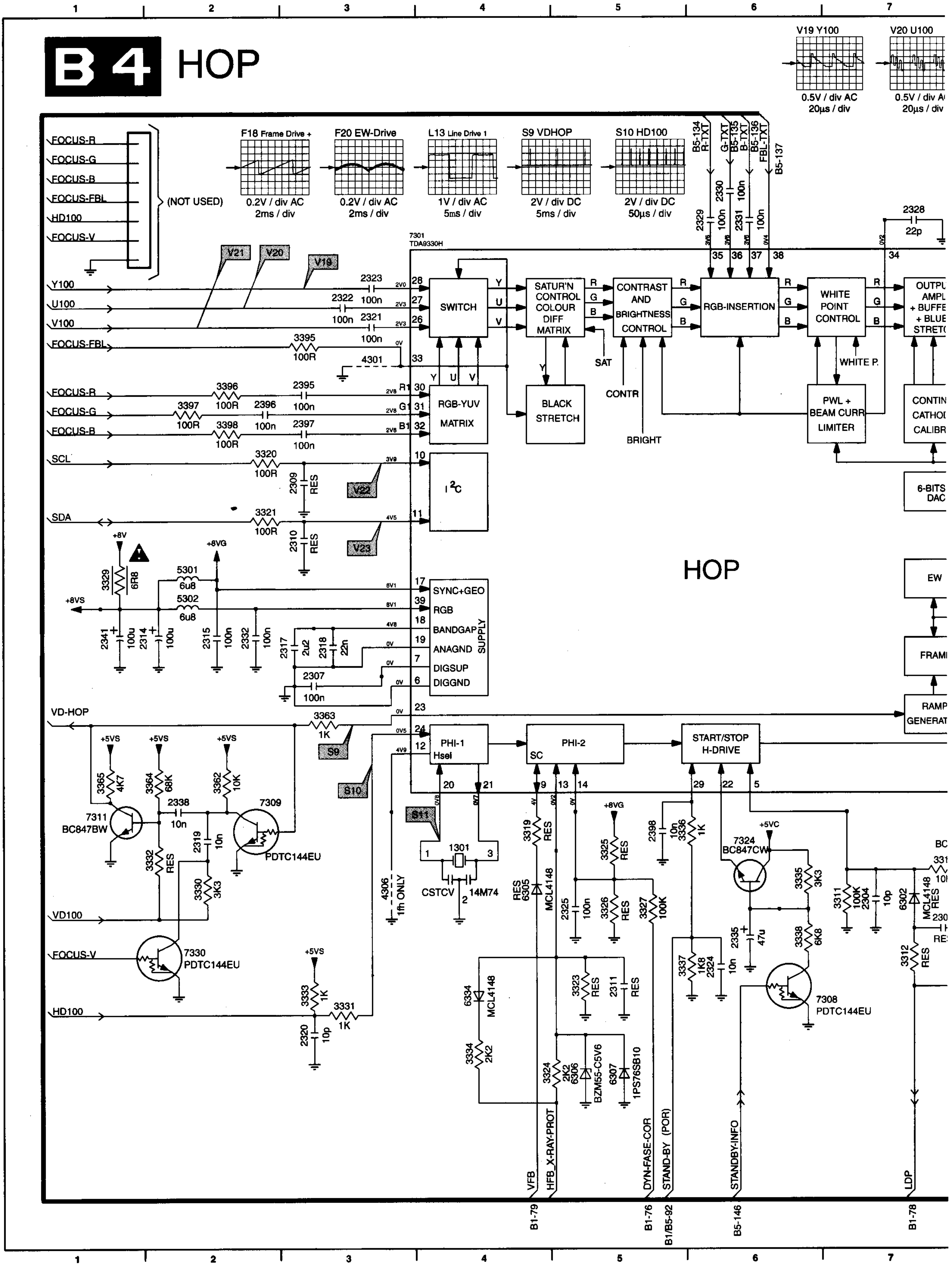

B3 FEATURE BOX
**: only for PHILIPS DNR memory
7714 MSM54V12222A
FIELD MEMORY
7713 MC33269D
7716 SOCKET PLCC32 (PICNIC-EPROM)
7701 BC857BW
7702 BC847BW
7704 PMBT2369
7709
MICRO-PROCESSOR PSP
CLK
TIMING
PICNIC SAA4978H
BACK END
PEAKING
MUX
MID END
HISTOGRAM
NOISE REDUCTION
TBC/SRC
MUX
3 X DAC
3 X ADC
ANALOG PROCESSING
FRONT END
PLL
OSC
BST
BUS A
BUS B
BUS C
S3 H-D 1V / div AC 5ms / div
S4 V-D 1V / div AC 2ms / div
S5 Y-IN 0.2V / div AC 10ms / div
S6 H-A 2V / div AC 10ms / div
S7 V-A 1V / div AC 5ms / div
V13 V-IN 0.2V / div AC 10ms / div
V14 Y-OUT 0.2V / div AC 5ms / div
V15 V-OUT 0.2V / div AC 5ms / div
V16 U-OUT 0.2V / div AC 5ms / div
V17 SCL 1V / div DC 0.2ms / div
V18 SDA 1V / div DC 0.2ms / div
B1-83,B3-SCL
B1-82,B3-SDA
B4-128 Y100
B4-129 U100
B4-130 V100
B4-131,B5-148 HD100
B4-132 VD100
B2-125 Y-PIP+MAIN-IN
B2-126 U-PIP+MAIN-IN
B2-127 V-PIP+MAIN-IN
B2-124 HA50
B2-123 VA50
+5VA
+5P
3V3_INT
+3D
+3A
+5M
+5VF
TO 61-7708 SNERT-DA
SNERT-CL TO 62-7708
TO 16-7714 AND 7715 RSTW
TO 25-7714 AND 7715 TO 60-7708 RSTR
FROM 88-7709 CLK-16
FROM 8-7709
interne SW
1 SN-DA
2 SN-CL
3 VSSO6
4 SCL
5 SDA
6 UP-RST
7 WD-RST
8 RSTW
9 RSTR
10 FBL
11 VDDA1
12 Y-OUT
13 VSSA1
14 U-OUT
15 V-OUT
16 VSSA2
17 BGEXT
18 H-D
19 V-D
20 AGND
21 DIFFIN
22 VDDA2
23 Y-IN
24 VDDA3
25 U-IN
26 VIN
27 VSSA3
28 H-A
29 V-A
30 HREF-EXT
31 VDDA4
32 VSSA4
33 VSSX
34 OSC-I
35 OSC-O
36 TEST
37 TRST
38 TMS
39 TDI
40 TDO
1701 CX-5F 12M

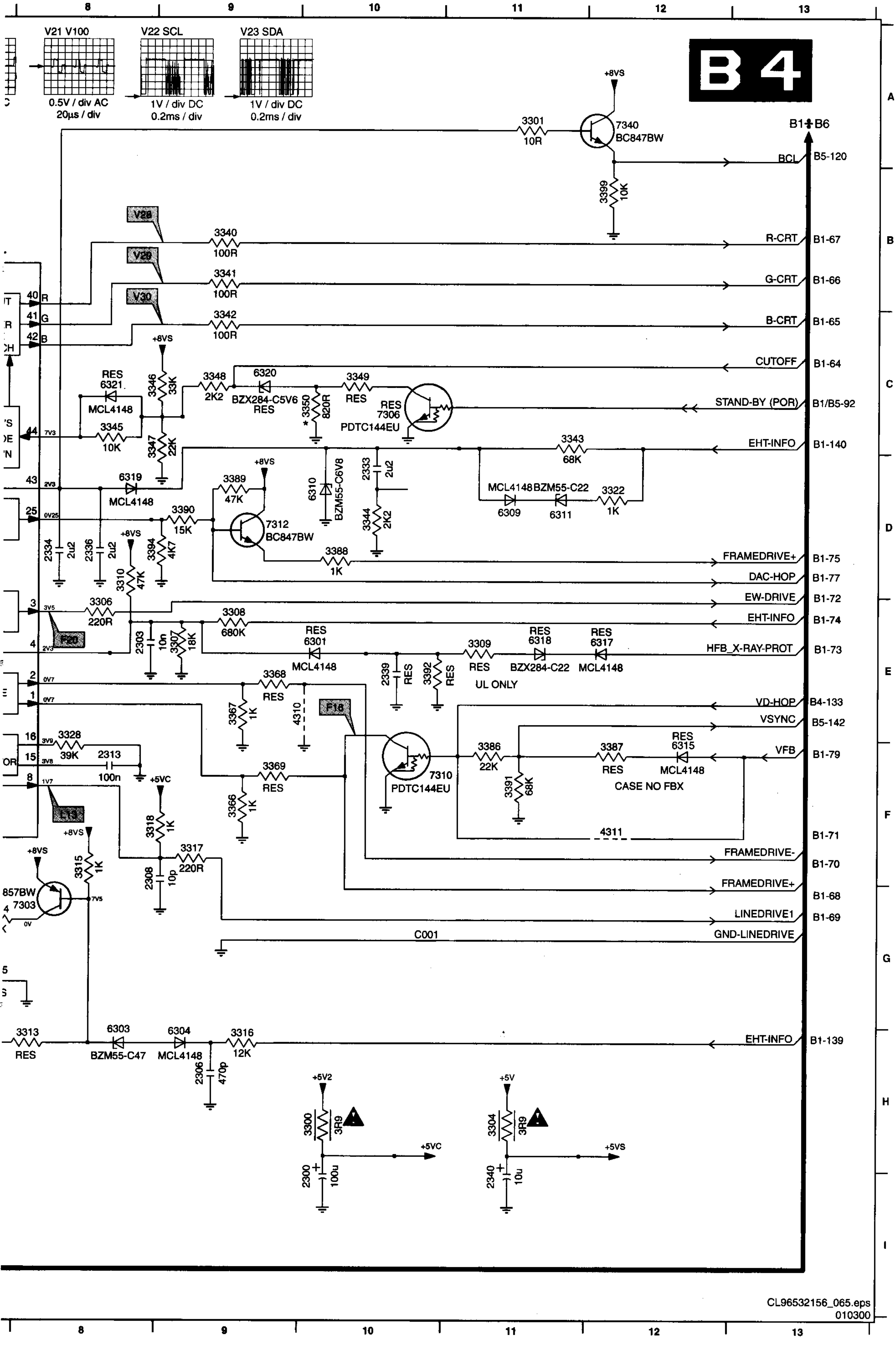

B3
11
12
13
14
15
A
B
C
D
E
F
G
H
I
J
K
7715
MSM54V12222A
FIELD MEMORY
VSS1
NC1
VSS3
VCC3
DIN11
DIN10
DIN9
DIN8
DIN7
DIN6
DIN5
DIN4
DIN3
DIN2
DIN1
DIN0
DOUT11
DOUT10
DOUT9
DOUT8
DOUT7
DOUT6
DOUT5
DOUT4
DOUT3
DOUT2
DOUT1
DOUT0
SWCK
RSTW
WE
IE
NC2
VCC1
SRCK
RSTR
RE
OE
VSS2
VCC2
FROM 88-7709
CLK-32
FROM 9-7709
RSTR
4735**
4736
4725**
RES
4724
4733
4734
3V3_INT
5713
600R
2728
100n
2792
100n
2790
100n
5716
RES
5717
RES
4791
RES
4792
4793
4731**
4726
4732
+5P
3797
100R
4707-A
4707-B
4707-C
4707-D
4708-A
4708-B
4708-C
4708-D
4709-A
4709-B
4709-C
4709-D
10R
4710
7708
SAA4990H
PROZONIC
2788
100n
3796
3702
22R
3739
100R
CLK-32
CLK-16
TO 15-7714
TO 20-7708
TO 15-7715
TO 26-7715
TO 26-7714
3746
4K7
4728
RES
FROM 2-7709
SNERT-CL
FROM 1-7709
SNERT-DA
FROM 9-7709
RSTR
2797
RES
2774
100n
2786
100n
RE1_OUT
RE2_OUT
WE2_OUT
CKL
UPCL
UPDA
RSTR
VRSYT
RE_IN
HREF
2758
2759
2760
2761
2762
2763
2764
2765
CL96532156_064.eps
010300

| | |
|---|---|
| 1701 | J4 |
| 2702 | B4 |
| 2703 | C3 |
| 2704 | C4 |
| 2706 | C1 |
| 2707 | C2 |
| 2708 | C3 |
| 2709 | C3 |
| 2710 | C4 |
| 2712 | D2 |
| 2713 | D10 |
| 2717 | F2 |
| 2718 | F2 |
| 2719 | F2 |
| 2720 | F2 |
| 2721 | G2 |
| 2723 | G2 |
| 2724 | G2 |
| 2725 | G2 |
| 2726 | G2 |
| 2728 | B14 |
| 2729 | I1 |
| 2730 | H4 |
| 2731 | I1 |
| 2733 | J2 |
| 2738 | J2 |
| 2743 | J2 |
| 2747 | J3 |
| 2748 | J4 |
| 2755 | B8 |
| 2756 | E2 |
| 2757 | C2 |
| 2758 | E13 |
| 2759 | E13 |
| 2760 | E14 |
| 2761 | E14 |
| 2762 | E14 |
| 2763 | E14 |
| 2764 | E14 |
| 2765 | E14 |
| 2766 | I4 |
| 2767 | K8 |
| 2770 | D1 |
| 2771 | G4 |
| 2772 | H4 |
| 2773 | I4 |
| 2774 | J11 |
| 2776 | D7 |
| 2785 | D9 |
| 2786 | I11 |
| 2788 | E11 |
| 2790 | D14 |
| 2792 | D11 |
| 2795 | B3 |
| 2796 | K6 |
| 2797 | J12 |
| 2798 | I4 |
| 3702 | J11 |
| 3703 | F4 |
| 3704 | D8 |
| 3705 | F4 |
| 3706 | D8 |
| 3707 | D4 |
| 3708 | E2 |
| 3709 | E4 |
| 3710 | F3 |
| 3711 | E3 |
| 3712 | F3 |
| 3713 | G3 |
| 3714 | I2 |
| 3716 | H2 |
| 3717 | I2 |
| 3718 | H4 |
| 3719 | C2 |
| 3720 | C2 |
| 3721 | B2 |
| 3722 | B2 |
| 3725 | J4 |
| 3728 | K2 |
| 3730 | K3 |
| 3731 | K4 |
| 3732 | K4 |
| 3733 | K2 |
| 3739 | J11 |
| 3740 | E3 |
| 3741 | D3 |
| 3744 | E3 |
| 3745 | D3 |
| 3746 | H13 |
| 3747 | F2 |
| 3748 | F2 |
| 3749 | G2 |
| 3754 | I2 |
| 3755 | J2 |
| 3757 | J2 |
| 3759 | J2 |
| 3790-A | B11 |
| 3790-B | B11 |
| 3790-C | C11 |
| 3790-D | C11 |
| 3791-A | B11 |
| 3791-B | B11 |
| 3791-C | B11 |
| 3791-D | B11 |
| 3792-A | B11 |
| 3792-B | A11 |
| 3792-C | A11 |
| 3792-D | A11 |
| 3793-A | G11 |
| 3793-B | G11 |
| 3793-C | G11 |
| 3793-D | G11 |
| 3794-A | G11 |
| 3794-B | G11 |
| 3794-C | H11 |
| 3794-D | H11 |
| 3795-A | H11 |
| 3795-B | H11 |
| 3795-C | H11 |
| 3795-D | I11 |
| 3796 | G11 |
| 3797 | C11 |
| 3798 | B2 |
| 4703 | F4 |
| 4707-A | A15 |
| 4707-B | A15 |
| 4707-C | B15 |
| 4707-D | B15 |
| 4708-A | B15 |
| 4708-B | B15 |
| 4708-C | C15 |
| 4708-D | C15 |
| 4709-A | C15 |
| 4709-B | C15 |
| 4709-C | D15 |
| 4709-D | D15 |
| 4710 | D15 |
| 4711 | E4 |
| 4720 | A9 |
| 4721 | A9 |
| 4722 | D9 |
| 4723 | D10 |
| 4724 | A11 |
| 4725 | A11 |
| 4726 | D11 |
| 4728 | H13 |
| 4731 | C11 |
| 4732 | D11 |
| 4733 | A13 |
| 4734 | A14 |
| 4735 | A11 |
| 4736 | A11 |
| 4790 | D9 |
| 4791 | D13 |
| 4792 | C13 |
| 4793 | D13 |
| 5701 | A3 |
| 5702 | B3 |
| 5703 | C1 |
| 5704 | C2 |
| 5705 | C3 |
| 5706 | D2 |
| 5707 | H2 |
| 5708 | F2 |
| 5709 | G2 |
| 5710 | G2 |
| 5711 | D10 |
| 5713 | A14 |
| 5715 | D9 |
| 5716 | D11 |
| 5717 | D12 |
| 5718 | H4 |
| 5720 | B8 |
| 7701 | D2 |
| 7702 | E3 |
| 7704 | H2 |
| 7708 | F13 |
| 7709 | E5 |
| 7713 | B2 |
| 7714 | A10 |
| 7715 | A12 |
| 7716 | B7 |

| Diversity Small Signal Panel (B3) | | | |
|---|---|---|---|
| Item | *100HZ INCR ST* | *DS VIRT DLB* | *100HZ DLB* |
| 2728 | - | 100N | - |
| 2758 | - | 100N | - |
| 2759 | - | 100N | - |
| 2760 | - | 100N | - |
| 2761 | - | 100N | - |
| 2762 | - | 100N | - |
| 2763 | - | 100N | - |
| 2764 | - | 100N | - |
| 2765 | - | 100N | - |
| 2790 | - | 100N | - |
| 3793 | 10R | 100R | 10R |
| 3794 | 10R | 100R | 10R |
| 3795 | 10R | 100R | 10R |
| 3796 | 10R | 100R | 10R |
| 4707 | 10R | - | 10R |
| 4708 | 10R | - | 10R |
| 4709 | 10R | - | 10R |
| 4710 | JUMP | - | JUMP |
| 4734 | - | JUMP | - |
| 4792 | - | JUMP | - |
| 4793 | - | JUMP | - |
| 5713 | - | FXDIND | - |
| 7708 | - | SAA4990H | - |
| 7715 | - | MSM54V12222A-30JS | - |

## HOP

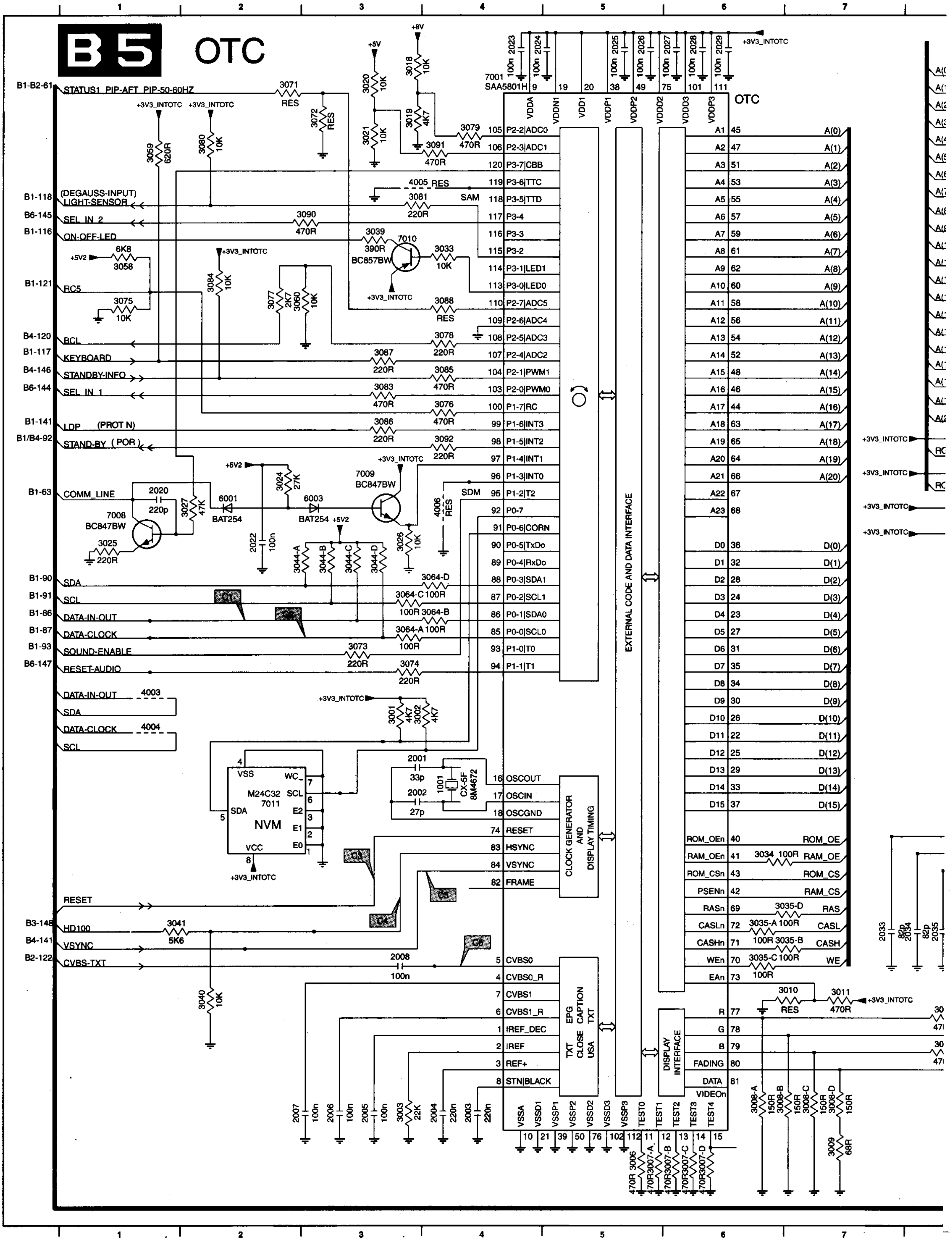

B 4 HOP
V19 Y100
0.5V / div AC
20µs / div
V20 U100
0.5V / div AC
20µs / div
F18 Frame Drive +
0.2V / div AC
2ms / div
F20 EW-Drive
0.2V / div AC
2ms / div
L13 Line Drive 1
1V / div AC
5ms / div
S9 VDHOP
2V / div DC
5ms / div
S10 HD100
2V / div DC
50µs / div
FOCUS-R
FOCUS-G
FOCUS-B
FOCUS-FBL
HD100
FOCUS-V
(NOT USED)
V21
V20
V19
Y100
U100
V100
FOCUS-FBL
FOCUS-R
FOCUS-G
FOCUS-B
SCL
SDA
7301
TDA9330H
2323 100n
2322 100n
2321 100n
3395 100R
4301
3396 100R
3397 100R
3398 100R
2395 100n
2396 100n
2397 100n
3320 100R
2309 RES
3321 100R
2310 RES
V22
V23
SWITCH
SATUR'N CONTROL COLOUR DIFF MATRIX
CONTRAST AND BRIGHTNESS CONTROL
RGB-INSERTION
WHITE POINT CONTROL
OUTPUT AMPL + BUFFER + BLUE STRETCH
RGB-YUV MATRIX
BLACK STRETCH
PWL + BEAM CURR LIMITER
CONTIN CATHODE CALIBR
6-BITS DAC
I²C
SAT
CONTR
BRIGHT
WHITE P.
B5-134 R-TXT
G-TXT
B5-135 B-TXT
B5-136 FBL-TXT
B5-137
2329 100n
2330 100n
2331 100n
2328 22p
HOP
EW
FRAME
RAMP GENERATOR
+8V
3329 6R8
+8VG
5301 6u8
5302 6u8
+8VS
2341 100u
2314 100u
2315 100n
2332 100n
2317 2u2
2318 22n
2307 100n
SYNC+GEO
RGB
BANDGAP
ANAGND
DIGSUP
DIGGND
SUPPLY
VD-HOP
3363 1K
S9
S10
S11
PHI-1 Hsel
PHI-2 SC
START/STOP H-DRIVE
+5VS
3365 4K7
3364 68K
3362 10K
7311 BC847BW
2338 10n
7309
PDTC144EU
3332 RES
2319 10n
3330 3K3
VD100
FOCUS-V
7330 PDTC144EU
HD100
3333 1K
3331 1K
2320 10p
4306 1fh ONLY
1301
CSTCV
14M74
3319 RES
RES 6305
MCL4148
2325 100n
+8VG
3325 RES
3326 RES
3327 100K
6334 MCL4148
3334 2K2
3323 RES
2311 RES
3324 2K2
6306 BZM55-C5V6
6307 1PS76SB10
2398 10n
3336 1K
3337 1K8
2324 10n
+5VC
7324 BC847CW
2335 47u
3335 3K3
3338 6K8
7308 PDTC144EU
3311 100K
2304 10p
6302 MCL4148
3312 RES
VFB
HFB_X-RAY-PROT
DYN-FASE-COR
STAND-BY (POR)
STANDBY-INFO
LDP
B1-79
B1-76
B1/B5-92
B5-146
B1-78

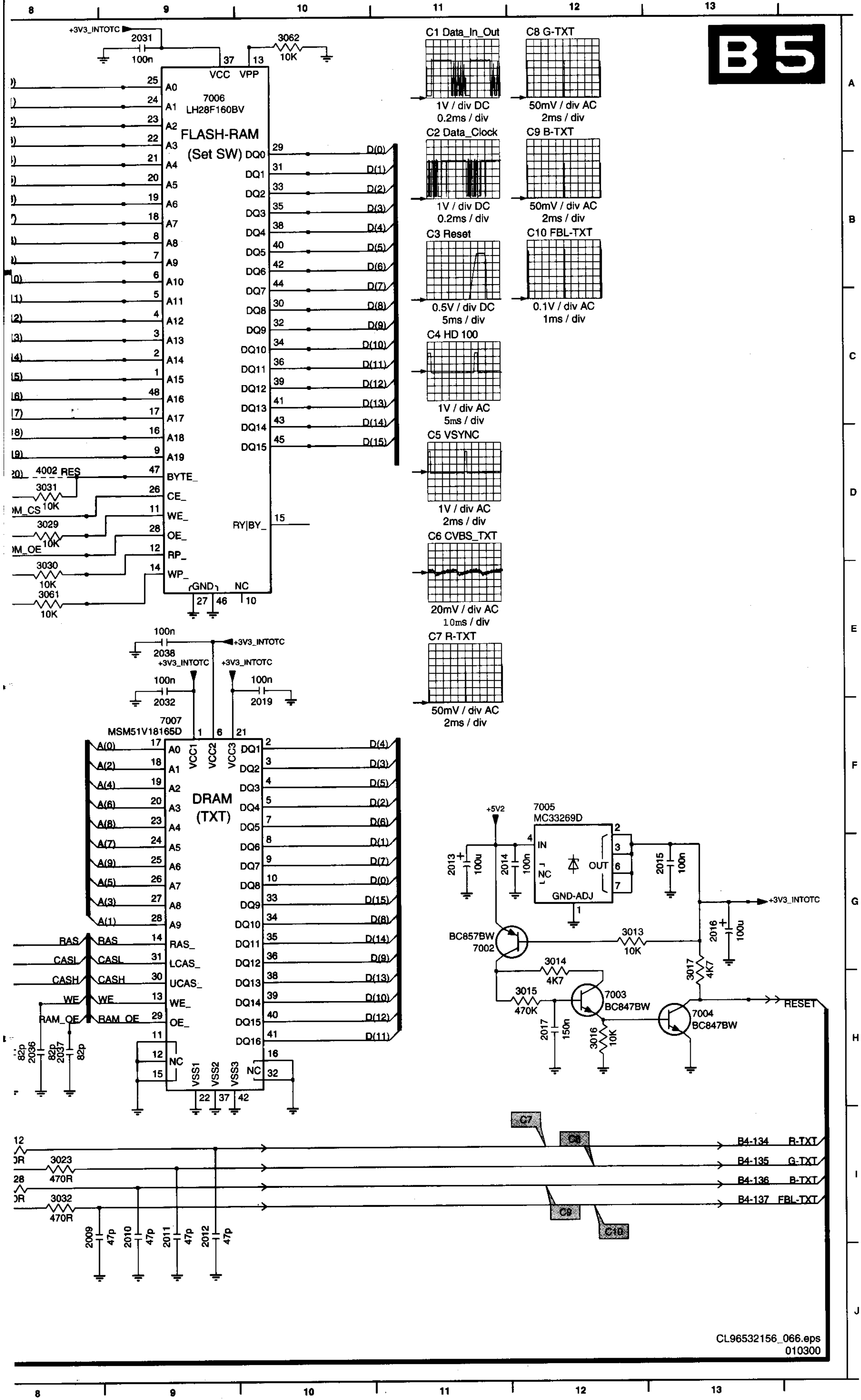

B 4
8
9
10
11
12
13
A
B
C
D
E
F
G
H
I
V21 V100
0.5V / div AC
20µs / div
V22 SCL
1V / div DC
0.2ms / div
V23 SDA
1V / div DC
0.2ms / div
+8VS
3301
10R
7340
BC847BW
3399
10K
B1 ╪ B6
BCL
B5-120
V28
3340
100R
R-CRT
B1-67
V29
3341
100R
G-CRT
B1-66
V30
3342
100R
B-CRT
B1-65
40 R
41 G
42 B
CUTOFF
B1-64
RES
6321
MCL4148
3346
33K
3348
2K2
6320
BZX284-C5V6
RES
3350
820R
3349
RES
RES
7306
PDTC144EU
STAND-BY (POR)
B1/B5-92
44
7V3
3345
10K
3347
22K
3343
68K
EHT-INFO
B1-140
43
2V3
6319
MCL4148
3389
47K
6310
BZM55-C6V8
2333
2u2
3344
2K2
MCL4148
6309
BZM55-C22
6311
3322
1K
25
0V25
3390
15K
7312
BC847BW
2334
2u2
2336
2u2
3394
4K7
3388
1K
FRAMEDRIVE+
B1-75
DAC-HOP
B1-77
3
3V5
3306
220R
3310
47K
EW-DRIVE
B1-72
F20
3308
680K
EHT-INFO
B1-74
4
2V3
2303
10n
3307
18K
RES
6301
MCL4148
2339
RES
3392
RES
3309
RES
UL ONLY
RES
6318
BZX284-C22
RES
6317
MCL4148
HFB_X-RAY-PROT
B1-73
2
0V7
1
0V7
3368
RES
3367
1K
4310
F18
VD-HOP
B4-133
VSYNC
B5-142
16
3V9
3328
39K
15
3V8
2313
100n
7310
PDTC144EU
3386
22K
3387
RES
RES
6315
MCL4148
CASE NO FBX
VFB
B1-79
3391
68K
8
1V7
3369
RES
3366
1K
+5VC
3318
1K
4311
B1-71
L13
3315
1K
3317
220R
FRAMEDRIVE-
B1-70
2308
10p
7303
7V5
0V
FRAMEDRIVE+
B1-68
LINEDRIVE1
B1-69
C001
GND-LINEDRIVE
3313
RES
6303
BZM55-C47
6304
MCL4148
3316
12K
2306
470p
EHT-INFO
B1-139
+5V2
3300
3R9
2300
100u
+5VC
+5V
3304
3R9
2340
10u
+5VS

CL96532156_065.eps
010300

| | |
|---|---|
| 1301 | G4 |
| 2300 | I10 |
| 2303 | E8 |
| 2304 | G7 |
| 2305 | G7 |
| 2306 | H9 |
| 2307 | E3 |
| 2308 | F8 |
| 2309 | D3 |
| 2310 | D3 |
| 2311 | H5 |
| 2313 | F8 |
| 2314 | E2 |
| 2315 | E2 |
| 2317 | E3 |
| 2318 | E3 |
| 2319 | G2 |
| 2320 | H3 |
| 2321 | C3 |
| 2322 | C3 |
| 2323 | B3 |
| 2324 | G6 |
| 2325 | G5 |
| 2328 | B7 |
| 2329 | B6 |
| 2330 | B6 |
| 2331 | B6 |
| 2332 | E2 |
| 2333 | D10 |
| 2334 | D8 |
| 2335 | G6 |
| 2336 | D8 |
| 2338 | F2 |
| 2339 | E10 |
| 2340 | I11 |
| 2341 | E1 |
| 2395 | C3 |
| 2396 | C2 |
| 2397 | C3 |
| 2398 | F5 |
| 3300 | H10 |
| 3301 | A11 |
| 3304 | H11 |
| 3306 | E8 |
| 3307 | E9 |
| 3308 | E9 |
| 3309 | E11 |
| 3310 | D8 |
| 3311 | G7 |
| 3312 | G7 |
| 3313 | H8 |
| 3314 | G7 |
| 3315 | F8 |
| 3316 | H9 |
| 3317 | F9 |
| 3318 | F8 |
| 3319 | F4 |
| 3320 | D2 |
| 3321 | D2 |
| 3322 | D12 |
| 3323 | H5 |
| 3324 | H4 |
| 3325 | G5 |
| 3326 | G5 |
| 3327 | G5 |
| 3328 | E8 |
| 3329 | E1 |
| 3330 | G2 |
| 3331 | H3 |
| 3332 | G2 |
| 3333 | H3 |
| 3334 | H4 |
| 3335 | G6 |
| 3336 | F5 |
| 3337 | G5 |
| 3338 | G6 |
| 3340 | B9 |
| 3341 | B9 |
| 3342 | C9 |
| 3343 | C11 |
| 3344 | D10 |
| 3345 | C8 |
| 3346 | C8 |
| 3347 | C8 |
| 3348 | C9 |
| 3349 | C10 |
| 3350 | C10 |
| 3362 | F2 |
| 3363 | F3 |
| 3364 | F2 |
| 3365 | F1 |
| 3366 | F9 |
| 3367 | E9 |
| 3368 | E9 |
| 3369 | F9 |
| 3386 | F11 |
| 3387 | F12 |
| 3388 | D10 |
| 3389 | D9 |
| 3390 | D9 |
| 3391 | F11 |
| 3392 | E10 |
| 3394 | D8 |
| 3395 | C3 |
| 3396 | C2 |
| 3397 | C2 |
| 3398 | C2 |
| 3399 | B12 |
| 4301 | C3 |
| 4306 | G3 |
| 4310 | E10 |
| 4311 | F12 |
| 5301 | E2 |
| 5302 | E2 |
| 6301 | E10 |
| 6302 | G7 |
| 6303 | H8 |
| 6304 | H9 |
| 6305 | G4 |
| 6306 | H5 |
| 6307 | H5 |
| 6309 | D11 |
| 6310 | D10 |
| 6311 | D11 |
| 6315 | F12 |
| 6317 | E12 |
| 6318 | E11 |
| 6319 | D8 |
| 6320 | C9 |
| 6321 | C8 |
| 6334 | H4 |
| 7301 | B3 |
| 7303 | G8 |
| 7306 | C10 |
| 7308 | H6 |
| 7309 | F3 |
| 7310 | F11 |
| 7311 | F1 |
| 7312 | D9 |
| 7324 | G6 |
| 7330 | G2 |
| 7340 | A12 |
| C001 | G10 |

# OTC


B5
OTC
7001
SAA5801H
OTC
STATUS1 PIP-AFT PIP-50-60HZ
(DEGAUSS-INPUT)
LIGHT-SENSOR
SEL_IN_2
ON-OFF-LED
RC5
BCL
KEYBOARD
STANDBY-INFO
SEL_IN_1
LDP (PROT N)
STAND-BY (POR)
COMM_LINE
SDA
SCL
DATA-IN-OUT
DATA-CLOCK
SOUND-ENABLE
RESET-AUDIO
RESET
HD100
VSYNC
CVBS-TXT
B1-B2-61
B1-118
B6-145
B1-116
B1-121
B4-120
B1-117
B4-146
B6-144
B1-141
B1/B4-92
B1-63
B1-90
B1-91
B1-86
B1-87
B1-93
B6-147
B3-148
B4-141
B2-122
+3V3_INTOTC
+5V
+8V
+5V2
7010
BC857BW
7009
BC847BW
7008
BC847BW
6001
BAT254
6003
BAT254
M24C32
7011
NVM
VSS
VCC
WC_
SCL
SDA
E2
E1
E0
CX-5F
8M4672
EXTERNAL CODE AND DATA INTERFACE
CLOCK GENERATOR AND DISPLAY TIMING
EPG CAPTION TXT
TXT CLOSE USA
DISPLAY INTERFACE
VDDA
VDDN1
VDD1
VDDP1
VDDP2
VDDD2
VDDD3
VDDP3
VSSA
VSSD1
VSSP1
VSSP2
VSSD2
VSSD3
VSSP3
TEST0
TEST1
TEST2
TEST3
TEST4
P2-2|ADC0
P2-3|ADC1
P3-7|CBB
P3-6|TTC
P3-5|TTD
P3-4
P3-3
P3-2
P3-1|LED1
P3-0|LED0
P2-7|ADC5
P2-6|ADC4
P2-5|ADC3
P2-4|ADC2
P2-1|PWM1
P2-0|PWM0
P1-7|RC
P1-6|INT3
P1-5|INT2
P1-4|INT1
P1-3|INT0
P1-2|T2
P0-7
P0-6|CORN
P0-5|TxDo
P0-4|RxDo
P0-3|SDA1
P0-2|SCL1
P0-1|SDA0
P0-0|SCL0
P1-0|T0
P1-1|T1
OSCOUT
OSCIN
OSCGND
RESET
HSYNC
VSYNC
FRAME
CVBS0
CVBS0_R
CVBS1
CVBS1_R
IREF_DEC
IREF
REF+
STN|BLACK
ROM_OEn
RAM_OEn
ROM_CSn
PSENn
RASn
CASLn
CASHn
WEn
EAn
FADING
DATA
VIDEOn
A(0)
A(1)
A(2)
A(3)
A(4)
A(5)
A(6)
A(7)
A(8)
A(9)
A(10)
A(11)
A(12)
A(13)
A(14)
A(15)
A(16)
A(17)
A(18)
A(19)
A(20)
D(0)
D(1)
D(2)
D(3)
D(4)
D(5)
D(6)
D(7)
D(8)
D(9)
D(10)
D(11)
D(12)
D(13)
D(14)
D(15)
ROM_OE
RAM_OE
ROM_CS
RAM_CS
RAS
CASL
CASH
WE
C1
C2
C3
C4
C5
C6
1
2
3
4
5
6
7


B5
8
9
10
11
12
13
A
B
C
D
E
F
G
H
I
J
+3V3_INTOTC
2031
100n
3062
10K
37
13
VCC
VPP
7006
LH28F160BV
FLASH-RAM
(Set SW)
A0
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
A12
A13
A14
A15
A16
A17
A18
A19
BYTE_
CE_
WE_
OE_
RP_
WP_
GND
NC
RY|BY_
DQ0
DQ1
DQ2
DQ3
DQ4
DQ5
DQ6
DQ7
DQ8
DQ9
DQ10
DQ11
DQ12
DQ13
DQ14
DQ15
D(0)
D(1)
D(2)
D(3)
D(4)
D(5)
D(6)
D(7)
D(8)
D(9)
D(10)
D(11)
D(12)
D(13)
D(14)
D(15)
4002 RES
3031
10K
3029
10K
3030
10K
3061
10K
C1 Data_In_Out
1V / div DC
0.2ms / div
C2 Data_Clock
1V / div DC
0.2ms / div
C3 Reset
0.5V / div DC
5ms / div
C4 HD 100
1V / div AC
5ms / div
C5 VSYNC
1V / div AC
2ms / div
C6 CVBS_TXT
20mV / div AC
10ms / div
C7 R-TXT
50mV / div AC
2ms / div
C8 G-TXT
50mV / div AC
2ms / div
C9 B-TXT
50mV / div AC
2ms / div
C10 FBL-TXT
0.1V / div AC
1ms / div
100n
2038
100n
2032
100n
2019
7007
MSM51V18165D
DRAM
(TXT)
VCC1
VCC2
VCC3
RAS_
LCAS_
UCAS_
WE_
OE_
NC
VSS1
VSS2
VSS3
DQ16
RAS
CASL
CASH
WE
RAM_OE
2036
82p
2037
82p
+5V2
7005
MC33269D
IN
OUT
GND-ADJ
2013
100u
2014
100n
2015
100n
2016
100u
BC857BW
7002
3013
10K
3014
4K7
3015
470K
7003
BC847BW
2017
150n
3016
10K
3017
4K7
7004
BC847BW
RESET
3023
470R
3032
470R
2009
47p
2010
47p
2011
47p
2012
47p
B4-134
R-TXT
B4-135
G-TXT
B4-136
B-TXT
B4-137
FBL-TXT
C7
C8
C9
C10
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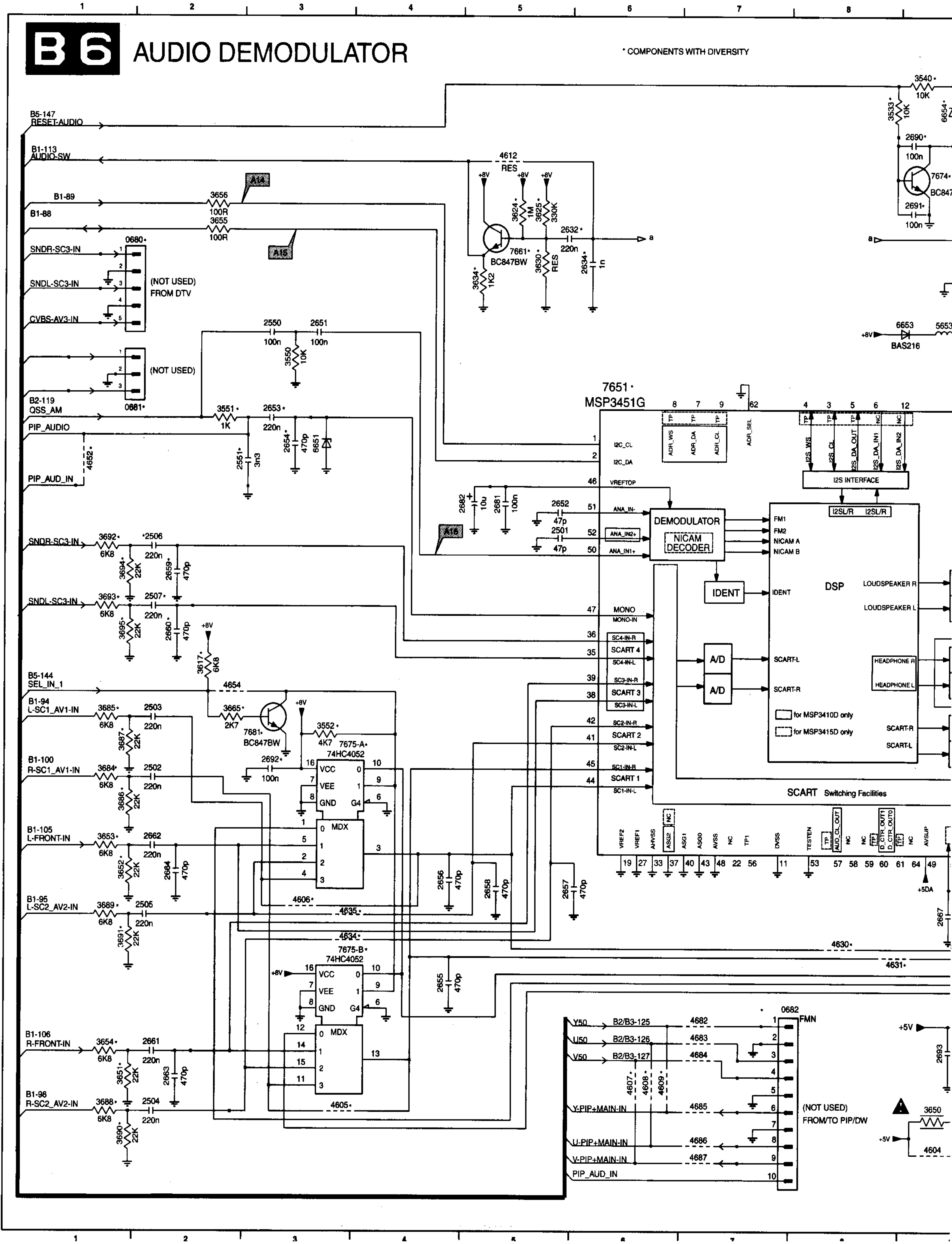
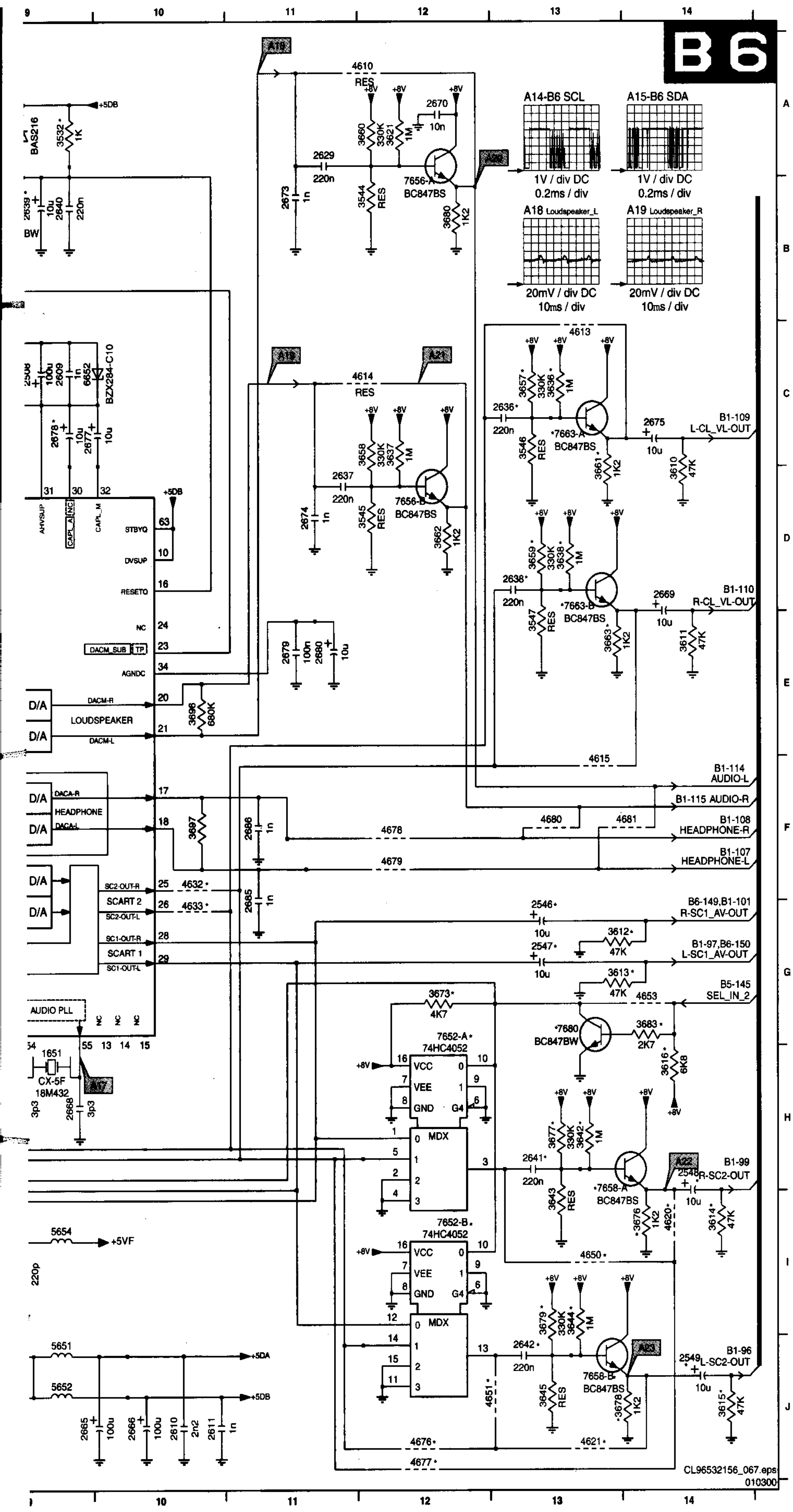
| | |
|---|---|
| 1001 | G4 |
| 2001 | G3 |
| 2002 | G3 |
| 2003 | J4 |
| 2004 | J4 |
| 2005 | J3 |
| 2006 | J3 |
| 2007 | J2 |
| 2008 | H3 |
| 2009 | I8 |
| 2010 | I9 |
| 2011 | I9 |
| 2012 | I9 |
| 2013 | G11 |
| 2014 | G11 |
| 2015 | G13 |
| 2016 | G13 |
| 2017 | H12 |
| 2019 | E10 |
| 2020 | D1 |
| 2022 | E2 |
| 2023 | A4 |
| 2024 | A4 |
| 2025 | A5 |
| 2026 | A5 |
| 2027 | A6 |
| 2028 | A6 |
| 2029 | A6 |
| 2031 | A9 |
| 2032 | E9 |
| 2033 | H7 |
| 2034 | H8 |
| 2035 | H8 |
| 2036 | H8 |
| 2037 | H8 |
| 2038 | E9 |
| 3001 | F3 |
| 3002 | F3 |
| 3003 | J3 |
| 3006 | J5 |
| 3007-A | J5 |
| 3007-B | J6 |
| 3007-C | J6 |
| 3007-D | J6 |
| 3008-A | I6 |
| 3008-B | I6 |
| 3008-C | I7 |
| 3008-D | I7 |
| 3009 | J7 |
| 3010 | I7 |
| 3011 | I7 |
| 3012 | I8 |
| 3013 | G12 |
| 3014 | G12 |
| 3015 | H12 |
| 3016 | H12 |
| 3017 | G13 |
| 3018 | A3 |
| 3019 | A3 |
| 3020 | A3 |
| 3021 | A3 |
| 3023 | I8 |
| 3024 | D2 |
| 3025 | E1 |
| 3026 | E3 |
| 3027 | E2 |
| 3028 | I8 |
| 3029 | D8 |
| 3030 | E8 |
| 3031 | D8 |
| 3032 | I8 |
| 3033 | B4 |
| 3034 | G6 |
| 3035-A | H6 |
| 3035-B | H7 |
| 3035-C | H6 |
| 3035-D | H7 |
| 3039 | B3 |
| 3040 | I2 |
| 3041 | H1 |
| 3044-A | E2 |
| 3044-B | E3 |
| 3044-C | E3 |
| 3044-D | E3 |
| 3058 | C1 |
| 3059 | B1 |
| 3060 | C2 |
| 3061 | E8 |
| 3062 | A10 |
| 3064-A | F3 |
| 3064-B | E4 |
| 3064-C | E3 |
| 3064-D | E4 |
| 3071 | A2 |
| 3072 | A3 |
| 3073 | F3 |
| 3074 | F3 |
| 3075 | C1 |
| 3076 | D4 |
| 3077 | C2 |
| 3078 | C4 |
| 3079 | A4 |
| 3080 | B2 |
| 3081 | B3 |
| 3083 | D3 |
| 3084 | C2 |
| 3085 | C4 |
| 3086 | D3 |
| 3087 | C3 |
| 3088 | C4 |
| 3090 | B3 |
| 3091 | B4 |
| 3092 | D4 |
| 4002 | D8 |
| 4003 | F1 |
| 4004 | F1 |
| 4005 | B3 |
| 4006 | E4 |
| 6001 | E2 |
| 6003 | E3 |
| 7001 | A4 |
| 7002 | G11 |
| 7003 | H12 |
| 7004 | H13 |
| 7005 | F12 |
| 7006 | A9 |
| 7007 | F9 |
| 7008 | E1 |
| 7009 | D3 |
| 7010 | B3 |
| 7011 | G2 |

## Audio demodulator


B6 AUDIO DEMODULATOR
* COMPONENTS WITH DIVERSITY
B5-147 RESET-AUDIO
B1-113 AUDIO-SW
B1-89
B1-88
3656 100R
3655 100R
A14
A15
A16
4612 RES
+8V
3624* 1M
3625* 330K
2632* 220n
2634* 1n
7661* BC847BW
3634* 1K2
3630* RES
a
0680*
SNDR-SC3-IN
SNDL-SC3-IN
CVBS-AV3-IN
(NOT USED) FROM DTV
(NOT USED)
0681*
2550 100n
2651 100n
3550 10K
B2-119 QSS_AM
PIP_AUDIO
PIP_AUD_IN
4652*
3551* 1K
2653* 220n
2551* 3n3
2654* 470p
6651
7651* MSP3451G
I2C_CL
I2C_DA
VREFTOP
ANA_IN-
ANA_IN2+
ANA_IN1+
ADR_WS
ADR_DA
ADR_CL
ADR_SEL
TP
NC
I2S_WS
I2S_CL
I2S_DA_OUT
I2S_DA_IN1
I2S_DA_IN2
I2S INTERFACE
I2SL/R
2682 10u
2681 100n
2652 47p
2501 47p
DEMODULATOR
NICAM DECODER
FM1
FM2
NICAM A
NICAM B
IDENT
DSP
LOUDSPEAKER R
LOUDSPEAKER L
MONO
MONO-IN
SC4-IN-R
SCART 4
SC4-IN-L
SC3-IN-R
SCART 3
SC3-IN-L
SC2-IN-R
SCART 2
SC2-IN-L
SC1-IN-R
SCART 1
SC1-IN-L
A/D
SCART-L
SCART-R
HEADPHONE R
HEADPHONE L
for MSP3410D only
for MSP3415D only
SCART Switching Facilities
VREF2
VREF1
AHVSS
ASG2
ASG1
ASG0
AVSS
TP1
DVSS
TESTEN
AUD_CL_OUT
D_CTR_OUT1
D_CTR_OUT0
AVSUP
+5DA
2667
SNDR-SC3-IN
3692* 6K8
*2506 220n
3694* 22K
2659* 470p
SNDL-SC3-IN
3693* 6K8
2507* 220n
3695* 22K
2660* 470p
3617* 6K8
B5-144 SEL_IN_1
4654
3665* 2K7
7681* BC847BW
3552* 4K7
7675-A* 74HC4052
2692* 100n
VCC
VEE
GND
G4
MDX
B1-94 L-SC1_AV1-IN
3685* 6K8
2503 220n
3687* 22K
B1-100 R-SC1_AV1-IN
3684* 6K8
2502 220n
3686* 22K
B1-105 L-FRONT-IN
3653* 6K8
2662 220n
3652* 22K
2664 470p
B1-95 L-SC2_AV2-IN
3689* 6K8
2505 220n
3691* 22K
2656 470p
2658 470p
2657 470p
4606*
4635*
4634*
4630*
4631*
7675-B* 74HC4052
2655 470p
B1-106 R-FRONT-IN
3654* 6K8
2661 220n
3651* 22K
2663 470p
B1-98 R-SC2_AV2-IN
3688* 6K8
2504 220n
3690* 22K
4605*
Y50 B2/B3-125 4682
U50 B2/B3-126 4683
V50 B2/B3-127 4684
4607*
4608*
4609*
Y-PIP+MAIN-IN 4685
U-PIP+MAIN-IN 4686
V-PIP+MAIN-IN 4687
PIP_AUD_IN
0682 FMN
(NOT USED) FROM/TO PIP/DW
3540* 10K
3533* 10K
6654*
2690* 100n
7674* BC847
2691* 100n
6653 BAS216
5653
+5V
2693
3650
4604
1
2
3
4
5
6
7
8


9
10
11
12
13
14
B 6
A
B
C
D
E
F
G
H
I
J
A19
4610
RES
+8V
2670
10n
2629
220n
3660
330K
3621
1M
7656-A
BC847BS
A20
2673
1n
3544
RES
3680
1K2
A14-B6 SCL
1V / div DC
0.2ms / div
A15-B6 SDA
1V / div DC
0.2ms / div
A18 Loudspeaker_L
20mV / div DC
10ms / div
A19 Loudspeaker_R
20mV / div DC
10ms / div
+5DB
BAS216
3532
1K
2639
10u
2640
220n
BW
2609
100u
1n
6652
BZX284-C10
2678
2677
10u
A18
A21
4614
RES
3658
330K
3637
1M
2637
220n
7656-B
BC847BS
2674
1n
3545
RES
3662
1K2
4613
3657
330K
3636
1M
2636
220n
7663-A
BC847BS
3546
RES
3661
1K2
2675
10u
3610
47K
B1-109
L-CL_VL-OUT
3659
330K
3638
1M
2638
220n
7663-B
BC847BS
3547
RES
3663
1K2
2669
10u
3611
47K
B1-110
R-CL_VL-OUT
31
30
32
AHVSUP
CAPL_A
NC
CAPL_M
STBYQ
63
DVSUP
10
RESETQ
16
NC
24
DACM_SUB
TP
23
AGNDC
34
2679
100n
2680
10u
D/A
DACM-R
LOUDSPEAKER
DACM-L
20
21
3696
680K
4615
B1-114
AUDIO-L
B1-115 AUDIO-R
DACA-R
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DACA-L
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B1-108
HEADPHONE-R
4679
B1-107
HEADPHONE-L
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SC2-OUT-L
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B5-145
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3673
4K7
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74HC4052
VCC
VEE
GND
G4
MDX
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BC847BW
3683
2K7
3616
6K8
3677
330K
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1M
2641
220n
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BC847BS
3643
RES
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1K2
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A22
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47K
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+5VF
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74HC4052
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330K
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1M
2642
220n
7658-B
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RES
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1K2
A23
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4676
4621
4677
5651
+5DA
5652
+5DB
2665
100u
2666
100u
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2n2
2611
1n
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2629 A11
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2637 D11
2638 D13
2639 B9
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2653 D3
2654 D3
2655 H4
2656 H4
2657 H5
2658 H5
2659 E2
2660 F2
2661 I2
2662 G2
2663 I2
2664 H2
2665 J9
2666 J10
2667 H9
2668 H9
2669 D14
2670 A12
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2674 D11
2675 C14
2677 C9
2678 C9
2679 E11
2680 E11
2681 D5
2682 D5
2685 F11
2686 F11
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2691 B9
2692 G3
2693 I9
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3617 F2
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3637 C12
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3644 I13
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3652 H1
3653 G1
3654 I1
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3657 C13
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3660 A12
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3662 D12
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3677 H13
3678 J13
3679 I13
3680 B12
3683 G14
3684 G1
3685 F1
3686 G1
3687 F1
3688 J1
3689 H1
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3691 H1
3692 E1
3693 E1
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4605 J3
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4608 I6
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4613 B13
4614 C12
4615 F13
4620 I14
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4630 H8
4631 H8
4632 F10
4633 G10
4634 H3
4635 H3
4650 I13
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4653 G14
4654 F2
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4678 F12
4679 F12
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4681 F14
4682 I7
4683 I7
4684 I7
4685 J7
4686 J7
4687 J7
5651 J9
5652 J9
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5654 I9
6651 D3
6652 C9
6653 C9
6654 A9
7651 D6
7652-A G12
7652-B I12
7656-A B12
7656-B D12
7658-A I13
7658-B J13
7661 B5
7663-A C13
7663-B D13
7674 B9
7675-A G4
7675-B H4
7680 G13
7681 F3

| Diversity Small Signal Panel (B6) | | | |
|---|---|---|---|
| Item | 100HZ INCR ST | DS VIRT DLB | 100HZ DLB |
| 2636 | 220N | - | - |
| 2638 | 220N | - | - |
| 2641 | 220N | - | - |
| 2642 | 220N | - | - |
| 2663 | - | 470P | 470P |
| 2664 | - | 470P | 470P |
| 2677 | 2U2 | 10U | 10U |
| 2678 | - | 10U | 10U |
| 2678 | - | 10U | 10U |
| 2685 | - | 1N | 1N |
| 2686 | - | 1N | 1N |
| 2692 | 100N | - | - |
| 3552 | 4K7 | - | - |
| 3617 | 6K8 | - | - |
| 3636 | 1M | - | - |
| 3638 | 1M | - | - |
| 3642 | 1M | - | - |
| 3644 | 1M | - | - |
| 3657 | 330K | - | - |
| 3659 | 330K | - | - |
| 3661 | 1K2 | - | - |
| 3663 | 1K2 | - | - |
| 3665 | 2K7 | - | - |
| 3676 | 1K2 | - | - |
| 3677 | 330K | - | - |
| 3678 | 1K2 | - | - |
| 3679 | 330K | - | - |
| 4605 | - | JUMP | JUMP |
| 4606 | - | JUMP | JUMP |
| 4613 | - | JUMP | JUMP |
| 4615 | - | JUMP | JUMP |
| 4620 | - | JUMP | JUMP |
| 4621 | - | JUMP | JUMP |
| 4630 | JUMP | - | - |
| 4631 | JUMP | - | - |
| 4632 | - | JUMP | JUMP |
| 4633 | - | JUMP | JUMP |
| 4634 | - | JUMP | JUMP |
| 4635 | - | JUMP | JUMP |
| 4650 | - | JUMP | JUMP |
| 4651 | - | JUMP | JUMP |
| 4678 | - | JUMP | JUMP |
| 4679 | - | JUMP | JUMP |
| 4680 | JUMP | - | - |
| 4681 | JUMP | - | - |
| 7651 | MSP3415D-FH-B3 | MSP3451G-FH-A1 | MSP3451G-FH-A1 |
| 7658 | BC847BS | - | - |
| 7663 | BC847BS | - | - |
| 7675 | 74HC4052PW | - | - |
| 7681 | BC847BW | - | - |

## SSP (LOT side overview)

1 2 3

A

B

C

D

**Part 1**

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**Part 2**

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**Part 3**

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**Part 4**

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A

B

C

D

| | |
|---|---|
| 1000 | B1 |
| 1001 | B3 |
| 1305 | A2 |
| 1308 | A2 |
| 1407 | A1 |
| 1409 | A2 |
| 2001 | A3 |
| 2002 | A3 |
| 2004 | B3 |
| 2005 | B3 |
| 2006 | B3 |
| 2007 | B3 |
| 2009 | B3 |
| 2010 | B3 |
| 2011 | B3 |
| 2012 | B3 |
| 2013 | A3 |
| 2016 | A3 |
| 2019 | A3 |
| 2020 | B3 |
| 2023 | B3 |
| 2025 | A3 |
| 2026 | B3 |
| 2027 | B3 |
| 2028 | A3 |
| 2029 | B3 |
| 2032 | A3 |
| 2033 | A3 |
| 2034 | A3 |
| 2035 | A3 |
| 2036 | A3 |
| 2037 | A3 |
| 2300 | B1 |
| 2314 | B1 |
| 2315 | B2 |
| 2317 | B2 |
| 2318 | B2 |
| 2332 | B2 |
| 2335 | B2 |
| 2336 | B2 |
| 2340 | B2 |
| 2341 | B2 |
| 2350 | B1 |
| 2351 | B1 |
| 2352 | B1 |
| 2356 | B2 |
| 2357 | B2 |
| 2358 | A2 |
| 2365 | A1 |
| 2367 | A1 |
| 2368 | A1 |
| 2376 | B2 |
| 2377 | B2 |
| 2398 | B2 |
| 2406 | A2 |
| 2407 | A2 |
| 2408 | A2 |
| 2409 | A2 |
| 2410 | A2 |
| 2411 | A2 |
| 2417 | A2 |
| 2418 | A2 |
| 2501 | D2 |
| 2506 | C2 |
| 2507 | C2 |
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| 2547 | C1 |
| 2548 | C1 |
| 2549 | C1 |
| 2550 | C2 |
| 2609 | D2 |
| 2636 | D2 |
| 2638 | D1 |
| 2639 | D2 |
| 2641 | D1 |
| 2642 | C1 |
| 2651 | D2 |
| 2665 | D2 |
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| 2678 | D2 |
| 2680 | D2 |
| 2682 | D2 |
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| 2691 | D2 |
| 2692 | C1 |
| 2693 | D1 |
| 2702 | D3 |
| 2703 | D2 |
| 2704 | C3 |
| 2706 | C3 |
| 2708 | C2 |
| 2709 | C3 |
| 2713 | D3 |
| 2729 | C2 |
| 2733 | C3 |
| 2738 | C3 |
| 2743 | C3 |
| 2757 | C3 |
| 2765 | D3 |
| 2767 | C3 |
| 2771 | C3 |
| 2772 | C3 |
| 2773 | C3 |
| 2774 | D3 |
| 2776 | C3 |
| 2785 | C3 |
| 2790 | D3 |
| 2796 | C3 |
| 2797 | D3 |
| 2798 | C3 |
| 3003 | B3 |
| 3010 | B3 |
| 3011 | B3 |
| 3012 | B3 |
| 3018 | B3 |
| 3019 | B3 |
| 3020 | B3 |
| 3021 | B3 |
| 3023 | B3 |
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| 3034 | A3 |
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| 3090 | B3 |
| 3091 | B3 |
| 3092 | B3 |
| 3300 | B1 |
| 3301 | B2 |
| 3304 | B2 |
| 3317 | B1 |
| 3318 | B2 |
| 3329 | B1 |
| 3335 | B2 |
| 3338 | B2 |
| 3370 | A1 |
| 3376 | B2 |
| 3377 | B2 |
| 3393 | A2 |
| 3394 | B2 |
| 3399 | B2 |
| 3400 | B2 |
| 3406 | A2 |
| 3411 | A2 |
| 3414 | A2 |
| 3417 | A2 |
| 3418 | A2 |
| 3437 | A2 |
| 3532 | D2 |
| 3533 | D2 |
| 3540 | D2 |
| 3546 | D2 |
| 3547 | D1 |
| 3550 | C2 |
| 3552 | C1 |
| 3610 | D1 |
| 3611 | D1 |
| 3612 | D1 |
| 3613 | C1 |
| 3614 | C1 |
| 3615 | C1 |
| 3616 | C2 |
| 3617 | C2 |
| 3636 | D2 |
| 3638 | D1 |
| 3642 | D2 |
| 3643 | D1 |
| 3644 | D2 |
| 3645 | D1 |
| 3650 | D1 |
| 3657 | D2 |
| 3659 | D1 |
| 3661 | D1 |
| 3663 | D1 |
| 3665 | C2 |
| 3676 | D2 |
| 3677 | D1 |
| 3678 | D2 |
| 3679 | D1 |
| 3683 | C2 |
| 3692 | C2 |
| 3693 | C2 |
| 3694 | C2 |
| 3695 | C2 |
| 3697 | D2 |
| 3702 | D3 |
| 3703 | C3 |
| 3704 | C3 |
| 3705 | C3 |
| 3706 | C3 |
| 3714 | C2 |
| 3716 | C2 |
| 3717 | C2 |
| 3728 | C3 |
| 3733 | C3 |
| 3739 | D3 |
| 3755 | C3 |
| 3757 | C3 |
| 3759 | C3 |
| 3790 | D3 |
| 3791 | D3 |
| 3792 | D3 |
| 3797 | D3 |
| 4311 | B1 |
| 4322 | A1 |
| 4326 | B2 |
| 4605 | C2 |
| 4606 | C2 |
| 4607 | C2 |
| 4608 | C2 |
| 4609 | C2 |
| 4613 | D2 |
| 4615 | D1 |
| 4632 | D2 |
| 4633 | D2 |
| 4653 | C2 |
| 4654 | C2 |
| 4678 | D2 |
| 4679 | D2 |
| 4682 | C2 |
| 4683 | C2 |
| 4684 | C2 |
| 4685 | C2 |
| 4686 | C2 |
| 4687 | C2 |
| 4720 | D3 |
| 4721 | D3 |
| 4722 | B3 |
| 4723 | D3 |
| 4726 | D3 |
| 4731 | D3 |
| 4732 | D3 |
| 4733 | D3 |
| 4734 | D3 |
| 4791 | D3 |
| 4792 | D3 |
| 4793 | D3 |
| 5010 | C1 |
| 5011 | C1 |
| 5012 | B1 |
| 5013 | B1 |
| 5014 | B1 |
| 5015 | C1 |
| 5016 | C1 |
| 5017 | B1 |
| 5018 | C1 |
| 5019 | C1 |
| 5020 | C1 |
| 5021 | B1 |
| 5301 | B2 |
| 5302 | B2 |
| 5403 | A2 |
| 5405 | B2 |
| 5407 | A2 |
| 5653 | D2 |
| 5654 | D1 |
| 5702 | C2 |
| 5707 | C2 |
| 5711 | D3 |
| 5713 | D3 |
| 5715 | D3 |
| 5716 | D3 |
| 5717 | D3 |
| 5911 | C1 |
| 5912 | C1 |
| 5913 | C1 |
| 5914 | C1 |
| 5915 | C1 |
| 5916 | C1 |
| 5917 | C1 |
| 5918 | C1 |
| 5919 | C1 |
| 5920 | D1 |
| 5921 | D1 |
| 5922 | D1 |
| 5923 | D1 |
| 5924 | D1 |
| 5925 | D1 |
| 5926 | D1 |
| 5927 | C1 |
| 5928 | D1 |
| 5929 | D1 |
| 5930 | D1 |
| 5931 | A1 |
| 5932 | B1 |
| 5933 | B1 |
| 5934 | A1 |
| 5935 | B1 |
| 6001 | B3 |
| 6003 | B3 |
| 6403 | A2 |
| 6652 | D2 |
| 6653 | D2 |
| 6654 | D2 |
| 7001 | B3 |
| 7007 | A3 |
| 7008 | B3 |
| 7009 | B3 |
| 7010 | B3 |
| 7323 | A2 |
| 7340 | B2 |
| 7403 | A2 |
| 7658 | D2 |
| 7663 | D1 |
| 7674 | D2 |
| 7675 | C2 |
| 7680 | C2 |
| 7681 | C2 |
| 7704 | C3 |
| 7709 | C3 |
| 7714 | D3 |
| 7715 | D3 |

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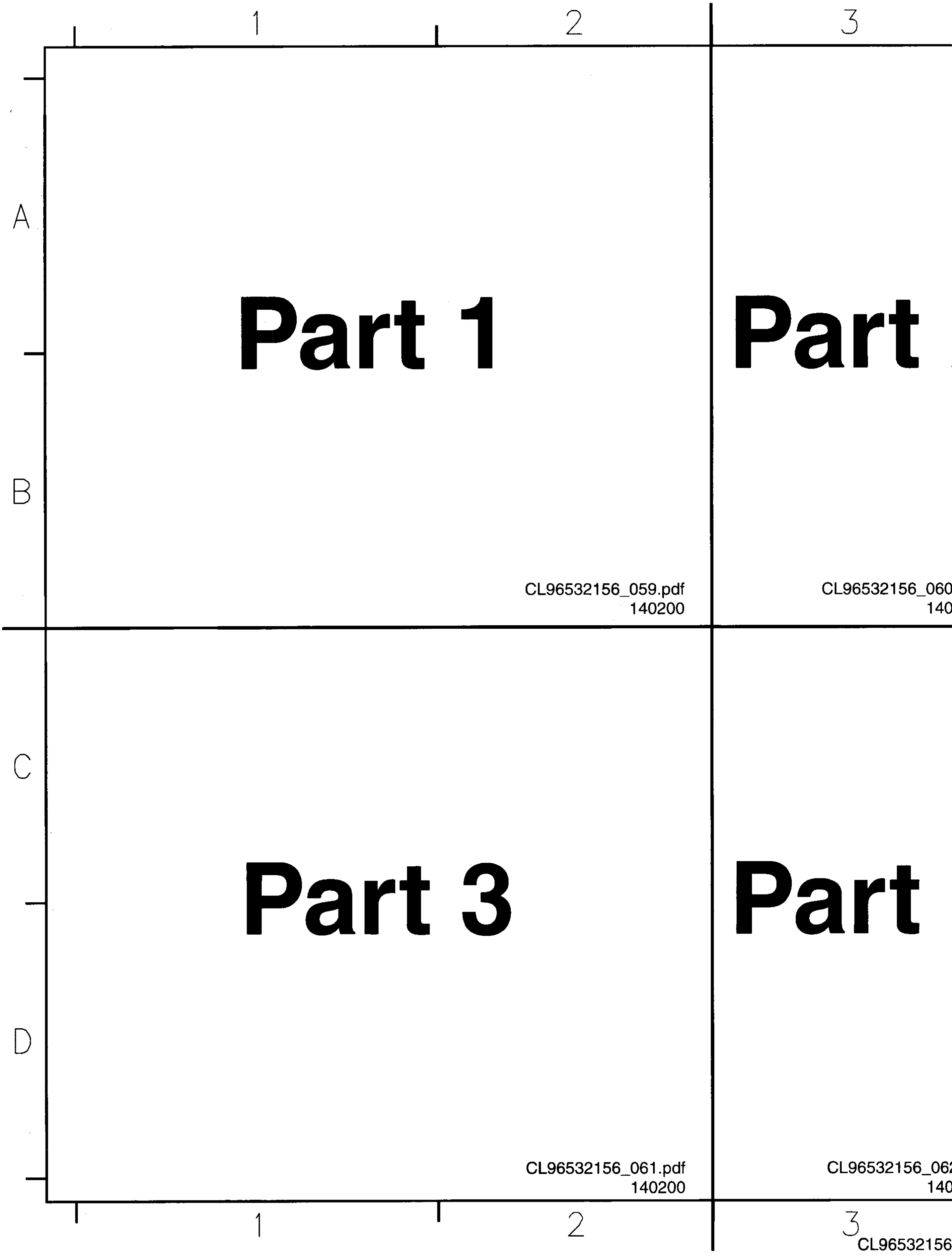
## SSP (tuner side overview)


1
2
3
A
B
C
D
Part 1
Part
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Part 3
Part
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C

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D

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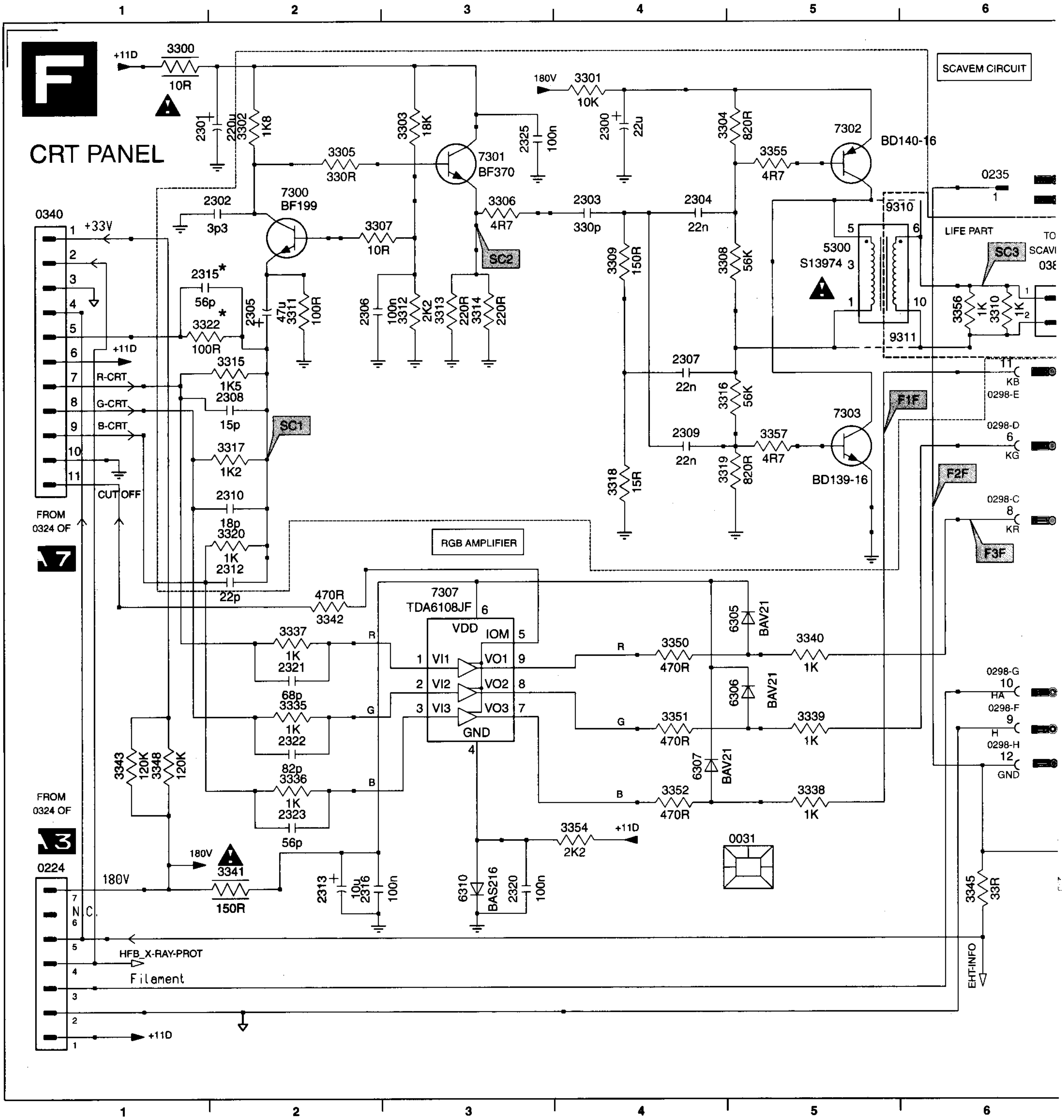
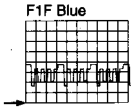
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0302 | A2 | 2718 | C2 | 3347 | B3 | 4005 | B1 |
| 0680 | D2 | 2719 | C1 | 3348 | B3 | 4006 | A1 |
| 0681 | C2 | 2720 | C1 | 3349 | B3 | 4301 | B2 |
| 0682 | D2 | 2721 | C1 | 3350 | B3 | 4306 | B2 |
| 1301 | B2 | 2723 | C1 | 3362 | B2 | 4310 | B3 |
| 1408 | A2 | 2724 | C1 | 3363 | B2 | 4604 | D3 |
| 1651 | D2 | 2725 | C2 | 3364 | B2 | 4610 | D3 |
| 1701 | C1 | 2726 | C1 | 3365 | A2 | 4612 | D2 |
| 2003 | B1 | 2728 | D1 | 3366 | B2 | 4614 | D2 |
| 2008 | B1 | 2730 | C1 | 3367 | B2 | 4620 | D2 |
| 2014 | A2 | 2731 | C1 | 3368 | B2 | 4621 | C2 |
| 2015 | A1 | 2747 | C1 | 3369 | B2 | 4630 | C3 |
| 2017 | A1 | 2748 | C1 | 3371 | A3 | 4631 | D3 |
| 2022 | A2 | 2755 | C1 | 3372 | B3 | 4634 | C2 |
| 2024 | B1 | 2756 | C1 | 3378 | A2 | 4635 | C2 |
| 2031 | A1 | 2758 | D1 | 3382 | A2 | 4650 | D2 |
| 2038 | A1 | 2759 | D1 | 3384 | A2 | 4651 | C2 |
| 2303 | B2 | 2760 | D1 | 3385 | A3 | 4652 | C2 |
| 2304 | B2 | 2761 | D1 | 3386 | B3 | 4676 | C2 |
| 2305 | B3 | 2762 | D1 | 3387 | B3 | 4677 | D2 |
| 2306 | B3 | 2763 | D1 | 3388 | B2 | 4680 | D3 |
| 2307 | B2 | 2764 | D1 | 3389 | B2 | 4681 | D3 |
| 2308 | B2 | 2766 | C1 | 3390 | B2 | 4703 | C1 |
| 2309 | B2 | 2770 | C1 | 3391 | B2 | 4707 | D1 |
| 2310 | B2 | 2786 | D1 | 3392 | B3 | 4708 | D1 |
| 2311 | B2 | 2788 | C1 | 3395 | A2 | 4709 | D1 |
| 2313 | B2 | 2792 | D1 | 3396 | A2 | 4710 | D1 |
| 2319 | B2 | 2795 | D2 | 3397 | A2 | 4711 | C1 |
| 2320 | B2 | 2900 | C3 | 3398 | A2 | 4724 | D1 |
| 2321 | B2 | 2901 | C3 | 3415 | A2 | 4725 | D1 |
| 2322 | B2 | 2902 | C3 | 3416 | A3 | 4728 | D1 |
| 2323 | B2 | 2903 | C3 | 3419 | A3 | 4735 | D1 |
| 2324 | B2 | 2904 | C3 | 3435 | A3 | 4736 | D1 |
| 2325 | B2 | 2905 | C3 | 3436 | A2 | 4790 | D1 |
| 2328 | B2 | 2906 | B3 | 3439 | A2 | 5404 | A2 |
| 2329 | B2 | 2907 | C3 | 3441 | A2 | 5406 | A3 |
| 2330 | B2 | 2908 | C3 | 3445 | A2 | 5408 | A2 |
| 2331 | B2 | 2909 | C3 | 3446 | B3 | 5409 | B3 |
| 2333 | B2 | 2910 | C3 | 3544 | D3 | 5410 | A2 |
| 2334 | B2 | 2911 | C3 | 3545 | D3 | 5651 | D3 |
| 2338 | B2 | 2912 | C3 | 3551 | C2 | 5652 | D3 |
| 2339 | B3 | 2913 | C3 | 3621 | D3 | 5701 | D1 |
| 2359 | A2 | 2914 | C3 | 3624 | D3 | 5703 | D1 |
| 2360 | A2 | 2915 | C3 | 3625 | D3 | 5704 | C1 |
| 2361 | A2 | 2916 | C3 | 3630 | D3 | 5705 | C1 |
| 2362 | A2 | 2917 | C3 | 3634 | D3 | 5706 | C1 |
| 2366 | A3 | 3001 | B1 | 3637 | D3 | 5708 | C1 |
| 2369 | B3 | 3002 | B1 | 3651 | C2 | 5709 | C1 |
| 2370 | B3 | 3006 | B1 | 3652 | C2 | 5710 | C1 |
| 2371 | A2 | 3007 | B1 | 3653 | C2 | 5718 | C1 |
| 2372 | A2 | 3008 | B1 | 3654 | C2 | 5720 | C1 |
| 2373 | A3 | 3009 | B1 | 3655 | D2 | 6301 | B3 |
| 2374 | A2 | 3013 | A1 | 3656 | D2 | 6302 | B2 |
| 2375 | A2 | 3014 | A2 | 3658 | D3 | 6303 | B3 |
| 2378 | A2 | 3015 | A1 | 3660 | D3 | 6304 | B3 |
| 2384 | A3 | 3016 | A1 | 3662 | D3 | 6305 | B3 |
| 2395 | A2 | 3017 | A1 | 3673 | C3 | 6306 | A2 |
| 2396 | A2 | 3030 | A1 | 3680 | D3 | 6307 | A2 |
| 2397 | A2 | 3031 | A1 | 3684 | C3 | 6309 | B2 |
| 2412 | A2 | 3040 | B1 | 3685 | C2 | 6310 | B2 |
| 2413 | A3 | 3044 | B1 | 3686 | C3 | 6311 | B2 |
| 2420 | B3 | 3060 | B2 | 3687 | C2 | 6315 | B3 |
| 2502 | C3 | 3061 | A1 | 3688 | C2 | 6317 | B3 |
| 2503 | C2 | 3064 | B1 | 3689 | C2 | 6318 | B3 |
| 2504 | C2 | 3077 | B2 | 3690 | C2 | 6319 | B2 |
| 2505 | C2 | 3306 | B2 | 3691 | C2 | 6320 | B3 |
| 2551 | C2 | 3307 | B2 | 3696 | D2 | 6321 | B2 |
| 2610 | D2 | 3308 | B3 | 3707 | C1 | 6334 | B2 |
| 2611 | D2 | 3309 | B3 | 3708 | C1 | 6651 | C2 |
| 2629 | D2 | 3310 | B3 | 3709 | C1 | 7002 | A2 |
| 2632 | D2 | 3311 | B2 | 3710 | C1 | 7003 | A2 |
| 2634 | D2 | 3312 | B3 | 3711 | C1 | 7004 | B1 |
| 2637 | D2 | 3313 | B3 | 3712 | C1 | 7005 | A1 |
| 2640 | D2 | 3314 | B2 | 3713 | C1 | 7006 | A1 |
| 2652 | D2 | 3315 | B3 | 3718 | C1 | 7011 | B1 |
| 2653 | C2 | 3316 | B3 | 3719 | C1 | 7301 | B2 |
| 2654 | C2 | 3319 | B2 | 3720 | C1 | 7303 | B2 |
| 2655 | D2 | 3320 | B2 | 3721 | C1 | 7306 | B3 |
| 2656 | C2 | 3321 | B2 | 3722 | C1 | 7308 | B2 |
| 2657 | C2 | 3322 | B2 | 3725 | C1 | 7309 | B2 |
| 2658 | C2 | 3323 | B2 | 3730 | C1 | 7310 | B2 |
| 2659 | C2 | 3324 | A2 | 3731 | C1 | 7311 | A2 |
| 2660 | C2 | 3325 | B2 | 3732 | C1 | 7312 | B2 |
| 2661 | C2 | 3326 | B2 | 3740 | C1 | 7320 | B3 |
| 2662 | C2 | 3327 | A2 | 3741 | C1 | 7322 | A2 |
| 2663 | C2 | 3328 | B2 | 3744 | C1 | 7324 | B2 |
| 2664 | C2 | 3330 | B2 | 3745 | C1 | 7330 | A2 |
| 2667 | D2 | 3331 | B2 | 3746 | D1 | 7407 | A3 |
| 2668 | D2 | 3332 | B2 | 3747 | C2 | 7411 | A3 |
| 2670 | D3 | 3333 | B2 | 3748 | C2 | 7651 | D2 |
| 2673 | D2 | 3334 | B2 | 3749 | C2 | 7652 | D3 |
| 2674 | D2 | 3336 | B2 | 3754 | C1 | 7656 | D3 |
| 2679 | D2 | 3337 | B3 | 3793 | D1 | 7661 | D3 |
| 2681 | D2 | 3340 | B2 | 3794 | D1 | 7701 | C1 |
| 2685 | D2 | 3341 | B2 | 3795 | D1 | 7702 | C1 |
| 2686 | D2 | 3342 | B2 | 3796 | C1 | 7708 | D1 |
| 2707 | C1 | 3343 | B2 | 3798 | C1 | 7713 | C1 |
| 2710 | C1 | 3344 | B2 | 4002 | A1 | 7716 | C1 |
| 2712 | C1 | 3345 | B2 | 4003 | B1 | | |
| 2717 | C1 | 3346 | B3 | 4004 | B1 | | |

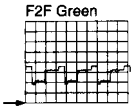
CL96532156_048.eps
180200

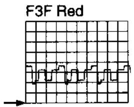
## CRT panel

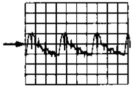
0031 E5
0224 E1
0235 A6
0298-A E8
0298-B E8
0298-C C6
0298-D C6
0298-E C6
0298-F D6
0298-G D6
0298-H E6
0298-I E9
0298-K E9
0334 F10
0340 B1
0383 B6
2300 A4
2301 A1
2302 A2
2303 A4
2304 A4
2305 B2
2306 B2
2307 B4
2308 C2
2309 C4
2310 C2
2312 D2
2313 E2
2315 B1
2316 E2
2317 F9
2318 E7
2320 E3
2321 D2
2322 E2
2323 E2
2324 F9
2325 A3
3300 A1
3301 A4
3302 A2
3303 A3
3304 A5
3305 A2
3306 A3
3307 B2
3308 B5
3309 B4
3310 B6
3311 B2
3312 B3
3313 B3
3314 B3
3315 B2
3316 C5
3317 C2
3318 C4
3319 C5
3320 C2
3322 B1
3334 E7
3335 D2
3336 E2
3337 D2
3338 E5
3339 D5
3340 D5
3341 E2
3342 D2
3343 E1
3345 E6
3347 F9
3348 E1
3349 E8
3350 D4
3351 D4
3352 E4
3354 E4
3355 A5
3356 B6
3357 C5
5300 B5
6305 D5
6306 D5
6307 E4
6310 E3
7300 A2
7301 A3
7302 A5
7303 C5
7307 D3
9310 A5
9311 B6

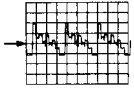

1
2
3
4
5
6
F
CRT PANEL
SCAVEM CIRCUIT
RGB AMPLIFIER
+11D
3300
10R
180V
3301
10K
2301
220u
3302
1K8
3303
18K
7301
BF370
2325
100n
2300
22u
3304
820R
7302
BD140-16
3355
4R7
3305
330R
0235
1
0340
+33V
2302
3p3
7300
BF199
3307
10R
3306
4R7
2303
330p
2304
22n
9310
5
6
5300
S13974
3
1
10
9311
LIFE PART
TO
SCAV
SC3
SC2
SC1
F1F
F2F
F3F
2315*
56p
3322
100R
2305
47u
3311
100R
2306
100n
3312
2K2
3313
220R
3314
220R
3309
150R
3308
56K
3356
1K
3310
1K
R-CRT
G-CRT
B-CRT
CUT OFF
3315
1K5
2308
15p
3317
1K2
2310
18p
3320
1K
2312
22p
2307
22n
3316
56K
2309
22n
3357
4R7
7303
BD139-16
3318
15R
3319
820R
11
KB
0298-E
0298-D
6
KG
0298-C
8
KR
FROM
0324 OF
7
470R
3342
7307
TDA6108JF
VDD
IOM
VI1
VI2
VI3
VO1
VO2
VO3
GND
3337
1K
2321
68p
3335
1K
2322
82p
3336
1K
2323
56p
R
G
B
6305
BAV21
6306
BAV21
6307
BAV21
3350
470R
3351
470R
3352
470R
3340
1K
3339
1K
3338
1K
0298-G
10
HA
0298-F
9
H
0298-H
12
GND
3343
120K
3348
120K
3
0224
180V
3341
150R
2313
10u
2316
100n
6310
BAS216
2320
100n
3354
2K2
0031
N.C.
HFB_X-RAY-PROT
Filament
3345
33R
EHT-INFO

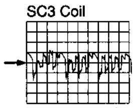

F1F Blue
50V / div DC
10ms / div

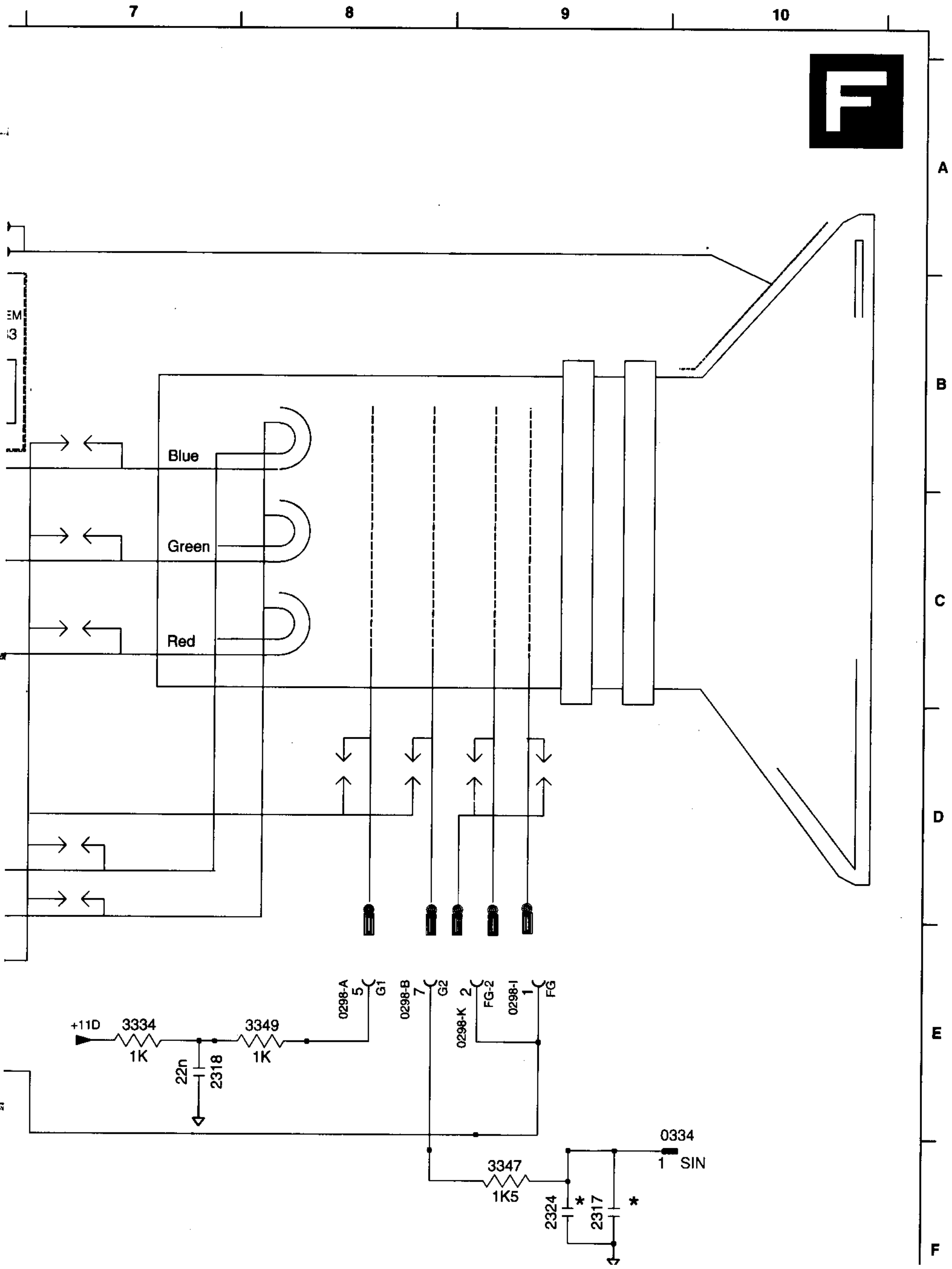

F2F Green
50V / div DC
10ms / div


F3F Red
50V / div DC
10ms / div


SC1 7300_E
20mV / div AC
10ms / div

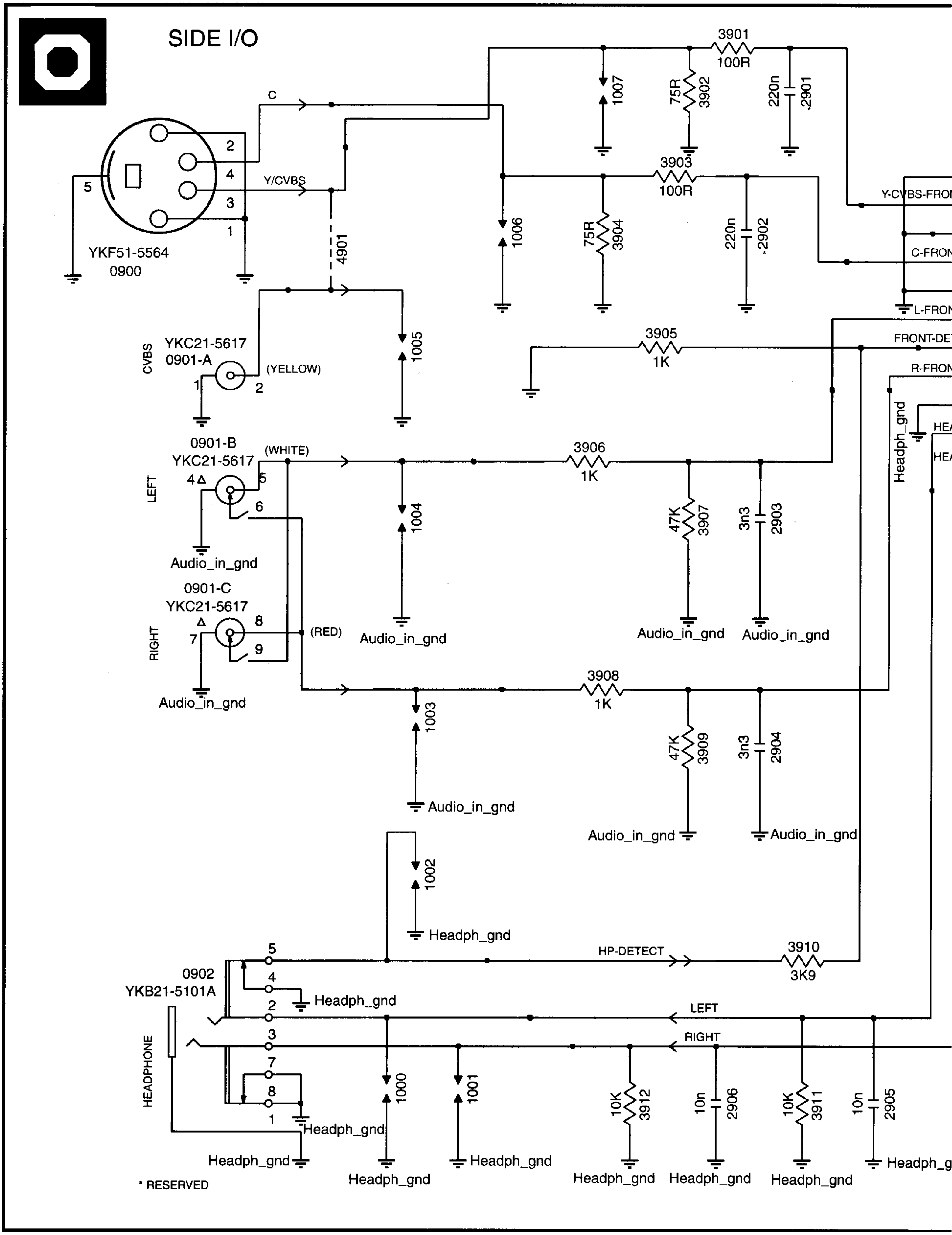

SC2 7301_E
1V / div AC
10ms / div

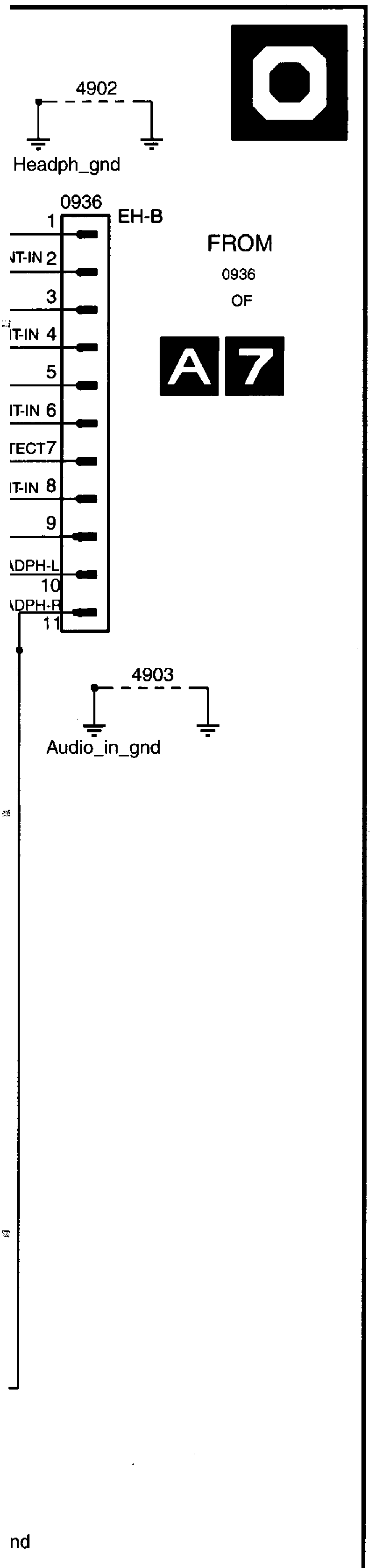

SC3 Coil
0,5V / div AC
10ms / div



| Diversity CRT-Panel | | | | | |
|---|---|---|---|---|---|
| **PosNr** | *29"* | *25"* | *28"* | *28" WS* | *32" WS* |
| 0298 | - | - | - | - | SOC 9P |
| 0298 | CON 8P | CON 8P | CON 8P | CON 8P | - |
| 0383 | CON 02P | - | - | CON 02P | CON 02P |
| 2300 | 22U | - | - | 22U | 22U |
| 2301 | 220U | - | - | 220U | 220U |
| 2302 | 3P3 | - | - | 3P3 | 3P3 |
| 2303 | 470P | - | - | 470P | 470P |
| 2304 | 22N | - | - | 22N | 22N |
| 2305 | 47U | - | - | 47U | 47U |
| 2306 | 100N | - | - | 100N | 100N |
| 2307 | 22N | - | - | 22N | 22N |
| 2308 | 15P | - | - | 15P | 15P |
| 2309 | 22N | - | - | 22N | 22N |
| 2310 | 18P | - | - | 18P | 18P |
| 2312 | 22P | - | - | 22P | 22P |
| 2317 | 4N7 | 4N7 | 4N7 | 4N7 | - |
| 2317 | 4N7 | 4N7 | 4N7 | 4N7 | - |
| 2321 | - | 68P | 68P | - | - |
| 2322 | - | 82P | 82P | - | - |
| 2323 | - | 56P | 56P | - | - |
| 2324 | - | - | - | - | 820P |
| 2325 | 100N | - | - | 100N | 100N |
| 3300 | FUSE 10R | - | - | FUSE 10R | FUSE 10R |
| 3301 | 3W 10K | - | - | 3W 10K | 3W 10K |
| 3302 | 1K8 | - | - | 1K8 | 1K8 |
| 3303 | 18K | - | - | 18K | 18K |
| 3304 | 820R | - | - | 820R | 820R |
| 3305 | 330R | - | - | 330R | 330R |
| 3306 | 4R7 | - | - | 4R7 | 4R7 |
| 3307 | 10R | - | - | 10R | 10R |
| 3308 | 56K | - | - | 56K | 56K |
| 3309 | 150R | - | - | 150R | 150R |
| 3310 | 1K | - | - | 1K | 1K |
| 3311 | 100R | - | - | 100R | 100R |
| 3312 | 2K2 | - | - | 2K2 | 2K2 |
| 3313 | 220R | - | - | 220R | 220R |
| 3314 | 220R | - | - | 220R | 220R |
| 3315 | 1K5 | - | - | 1K5 | 1K5 |
| 3316 | 56K | - | - | 56K | 56K |
| 3317 | 1K2 | - | - | 1K2 | 1K2 |
| 3318 | 15R | - | - | 15R | 15R |
| 3319 | 820R | - | - | 820R | 820R |
| 3320 | 1K | - | - | 1K | 1K |
| 3335 | 100R | - | - | 100R | 100R |
| 3335 | - | 1K | 1K | - | - |
| 3336 | 100R | - | - | 100R | 100R |
| 3336 | - | 1K | 1K | - | - |
| 3337 | 100R | - | - | 100R | 100R |
| 3337 | - | 1K | 1K | - | - |
| 3355 | 4R7 | - | - | 4R7 | 4R7 |
| 3356 | 1K | - | - | 1K | 1K |
| 3357 | 4R7 | - | - | 4R7 | 4R7 |
| 5300 | TFM | - | - | TFM | TFM |
| 7300 | SIGF199 | - | - | SIGF199 | SIGF199 |
| 7301 | SIGF370 | - | - | SIGF370 | SIGF370 |
| 7302 | TRA POW | - | - | TRA POW | TRA POW |
| 7303 | TRA POW | - | - | TRA POW | TRA POW |
| 9305 | WR | - | - | WR | WR |
| 9308 | WR | - | - | WR | WR |
| 9309 | WR | - | - | WR | WR |
| 9312 | WR | - | - | WR | WR |
| 9313 | WR | - | - | WR | WR |
| 9424 | - | - | - | - | WR |

## Side I/O


SIDE I/O
YKF51-5564
0900
C
Y/CVBS
1
2
3
4
5
4901
3901
100R
3902
75R
1007
2901
220n
*2901
3903
100R
3904
75R
1006
2902
220n
*2902
Y-CVBS-FRO
C-FRON
L-FRON
FRONT-DE
R-FRON
HE
HE
Headph_gnd
3905
1K
CVBS
YKC21-5617
0901-A
(YELLOW)
1005
LEFT
0901-B
YKC21-5617
(WHITE)
4
5
6
1004
3906
1K
3907
47K
2903
3n3
Audio_in_gnd
RIGHT
0901-C
YKC21-5617
7
8
9
(RED)
3908
1K
1003
3909
47K
2904
3n3
1002
Headph_gnd
HEADPHONE
0902
YKB21-5101A
5
4
2
3
7
8
1
HP-DETECT
3910
3K9
LEFT
RIGHT
1000
1001
3912
10K
2906
10n
3911
10K
2905
10n
* RESERVED


4902
Headph_gnd
0936
EH-B
1
NT-IN 2
3
IT-IN 4
5
IT-IN 6
TECT7
IT-IN 8
9
DPH-L
10
DPH-R
11
4903
Audio_in_gnd
FROM
0936
OF
A
7
nd

CL96532156_070.eps
110200

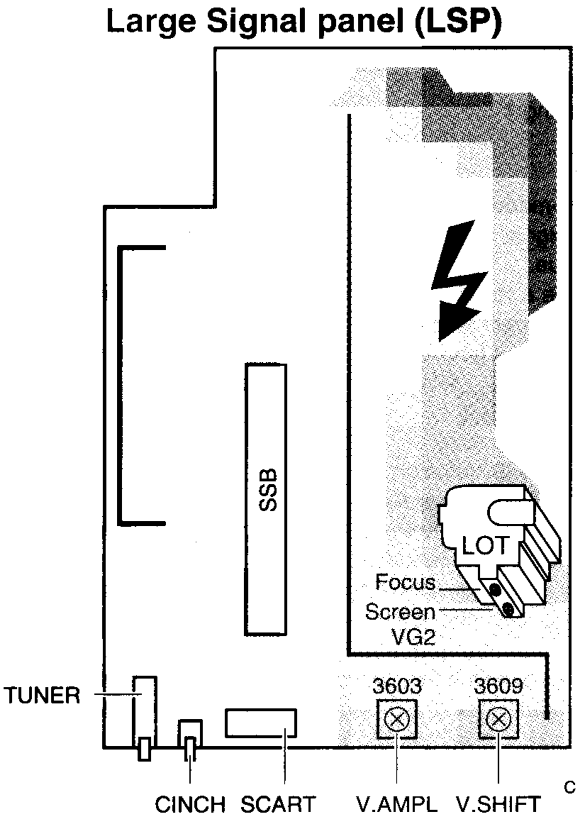
# 8. Electrical alignments

## 8.1 General alignment conditions

All electrical alignments should be made under the following conditions:

- Power supply voltage: 230 V ± 10 %; 50 - 60 Hz ± 5 %. Should be applied via an isolating transformer with low internal resistance.
- Warm-up time ≈ 20 minutes.
- Voltages and oscillograms are measured in relation to Tuner earth (with exception to the voltages on the primary side of the power supply). Never use the cooling fins/plates as ground: they are 'hot' ! ! !
- Test probe: Ri > 10 MΩ, Ci < 20 pF.
- Use an isolated trimmer/screwdriver for the alignments

## 8.2 Alignments on the large signal panel (LSP)



Warning
All alignments are on hot-part !

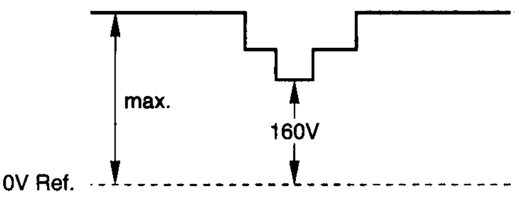
CL 96532156_011.eps
210100

Figure 8-1

### 8.2.1 Focusing

1. Tune the set to a crosshatch test pattern (use an external video pattern generator).
2. Adjust the Focus potentiometer (upper potmeter, see figure 8-1) for an overall optimum focusing of the picture.

### 8.2.2 Vg2 adjustment



86532031_007.AI
210100

Figure 8-2

Elucidation: In the frame blanking period of the R, G and B signals applied to the CRT, a measuring pulse with different DC levels is inserted by the 'HOP' video processor. Measure the black level pulse during the vertical flyback at the RGB cathodes of the CRT.

1. Put the set in the SDM mode (see chapter 5.2.1).
2. Insert a black test-pattern signal (carrier 475.25 MHz) to the Tuner input.
3. Connect an oscilloscope (position 50 V/Div DC and 2 ms/Div) alternately to the CRT cathodes (Red pin 8, Green pin 6, Blue pin 11) and measure for each cathode the DC level of the measuring pulse (see elucidation above and figure 8-2) and write down each value. Remark: Trigger the scope external via a CVBS signal (for instance via pin 19 of the SCART1 connection).
4. Adjust the Vg2 potentiometer (lower potmeter, see figure 8-1) so that the measuring pulse with the highest noted level is on $160 \pm 3\ V_{DC}$ level.

## 8.3 Vertical amplitude alignment

1. Tune the set to a crosshatch test pattern (use an external video pattern generator).
2. Align the vertical amplitude with R3603 (see Fig. 8-1) so that the complete test pattern is visible.

## 8.4 Vertical shift alignment

1. Tune the set to a crosshatch test pattern (use an external video pattern generator).
2. Align the vertical centering with R3609 (see Fig. 8-1) so that the test pattern is located vertically in the middle.
3. Repeat the 'vertical amplitude' alignment if necessary.

## 8.5 Alignments and settings in the Service Alignment Menu

### 8.5.1 General

Put the set in the SAM mode (see chapter 5.2.2). The Service Alignment Mode menu will now appear on the screen. Via 'Alignments' the following submenu's can be selected:

- General:
  - Drive
  - Luminance Delays
  - EHT Compensation
  - Soft clipper
  - Luma gain
  - IF AFC
  - Tuner AGC
  - Blend intensity
  - Adjust Peak White Limiter
  - Vg2 Test Pattern
- Normal Geometry: General geometry alignments.
- Super Wide Geometry: Geometry alignments for the 'Panorama' position in 16:9 sets (only valid for wide screen sets; alignments can be performed, however, it is better to set values as mentioned below).
- Options: Setting the initialisation codes in the set via text.
- Option Numbers: All options together, expressed in two long numbers. The original factory setting for these numbers can be found on the picture tube sticker on the inside of the set.
- Store: Store all alignments.

The alignments are explained now in the sequence of the sub-menu:

### 8.5.2 'General' alignments in Service Alignment Menu:

- Once all alignments/settings have been completed the item 'Store' must be selected to record all the values in the permanent memory of the set.
- If the Option codes have been changed and stored, the set has to be switched 'OFF' and 'ON' using the mains switch to activate the new settings (when switching via Standby, the option code settings are NOT read by the microprocessor).
- If an empty EAROM (permanent memory) is detected, all settings are set to pre-programmed default values.
- A built-in test pattern can be called up in various sub-menus. The test pattern generator can be switched on using the item 'Test pattern on/off'. The test pattern only appears AFTER the specific alignment has been selected. The test patterns are generated by the Teletext-IC (OTC).

***'Drive'***

- Method 1 (with colour analyser):
  1. If you want to align tint-settings with a colour-analyser, the Test pattern must be switched on. You get a white block in middle of the image now.
  2. Before doing the Tint-settings the 'Cathode'-parameter must be aligned. This is dependent of the picture tube size and brand. See table "Cathode parameter" for the colour-analyser readings.
  3. Tint-settings: Set the white levels for the 3 Tint-settings 'Normal', 'Warm' and 'Cool'. The next values must be aligned (see table "White levels").

| Cathode parameter | |
|---|---|
| CRT | Light output (cd/m$^2$) |
| 25" FS | 50,0 |
| 28" FS | 35,0 |
| 29" SF | 40,0 |
| 28" WS | 45,0 |
| 32" WS | 40,0 |

| White levels | | | |
|---|---|---|---|
| | Cool | Normal | Warm |
| X | 280 | 289 | 303 |
| Y | 287 | 299 | 314 |
| Temp. (K) | 10200 | 8700 | 7200 |

- Method 2 (without colour analyser):
  1. Without having a colour-analyser one can set some parameters. This is the next best solution. The setting-parameters are average values coming from production (statistics).
  2. Before doing the Tint-settings the 'Cathode'-parameter must be set. For all picture tubes the value '5' must be entered.
  3. The 'Tint' setting must be on 'normal'.
  4. Tint-settings: Set the Red, Green and Blue parameters for the 3 Tint-settings 'Normal', 'Warm' and 'Cool'. See table 8.4 for the values.
  5. Red BL offset: herewith the Black Level can be aligned very precise. Pre-set value is 7.
  6. Green BL offset: herewith the Black Level can be aligned very precise. Pre-set value is 7.

| Tint settings | | | |
|---|---|---|---|
| | Cool | Normal | Warm |
| R | 24 | 25 | 27 |
| G | 20 | 20 | 20 |
| B | 18 | 14 | 10 |

***'Luminance delays'***

With the 'Luminance delays' alignment the luminance information is placed on the chrominance information (brightness is pushed onto the colour). Use a colour bar/grey scale pattern as test signal.

- Lum. Delay Pal: Apply a PAL colour bar/grey scale pattern as a test signal. Adjust 'Lum. Delay Pal' until the transients of the colour part and black and white part of the test pattern are at the same position.
- Lum. Delay Secam: Apply a SECAM colour bar/grey scale pattern as a test signal. Adjust 'Lum. Delay Pal' until the transients of the colour part and black and white part of the test pattern are at the same position.
- Lum. Delay Bypass: apply a NTSC colour bar/greyscale pattern as a test signal. Adjust value until the transients of the colour and black & white part of the test area are at the same position.

***'EHT compensation'***

Fixed setting: 0

***'Soft clipper"***

Fixed setting:Pwl + 0%

***'Luma gain'***

Fixed setting:1

***'IF AFC'***

The SAM-mode is needed to make alignment, a test generator to make signal and the Installation-menu to check the 'Fine Tune' value.
Supply, via a video generator (e.g. PM5518), a TV-signal with a signal-strength of at least 1 mV and a frequency of 475.25 MHz. Use BG if possible, otherwise match the system of your generator with the received signal in the set.

Alignment procedure:

1. Go to the 'Installation' menu.
2. Select 'Manual installation'.
3. Tune the TV-set to the system and frequency described above via 'Search' - '475' - 'OK'.
4. If the frequency showed in the line 'Fine tune' is between 475.18 MHz and 475.31 MHz, you don't need to re-adjust the IF-AFC.
5. If not, adjust the frequency in the 'Fine tune' line to 475.25 MHz and 'Store' the program (this is very important because this will disable the AFC algorythm).
6. Now go to the SAM and select 'Alignments' - 'General' - 'IF AFC'.
7. During the 'IF AFC'-parameter adjustment, one can see OSD feedback in the top of the screen. The OSD feedback can give 4 kind of messages:

| AFC-window | AFC-frequency versus reference |
|---|---|
| Out | High |
| In | High |
| In | Low |
| Out | Low |

The first item (In or Out) informs you whether you are in or out the AFC-window.
The second item (High or Low) informs you about whether the AFC-frequency is too high or too low.

1. First you must align the 'IF AFC'-parameter such that you come into the AFC-window (= 'In')
2. Then you must look for the point where the 'IF AFC'-parameter changes from High to Low. This level is the value you are looking for.
3. After adjustment 'Store' the value.
4. Now return to the 'Installation' menu.
5. Select 'Manual Installation' - 'Search' - '475' - 'OK' and 'Store'. This will set the AFC 'on' again.

Service-tip: If you do not trust the accuracy of the frequency of your Service-generator, first 'measure' with 'Fine tune'-line (manual install-menu) of a good set your video generator.

***'Tuner AGC'***

The SAM-mode is needed to make alignment, a test generator to make signal, a DC-Voltmeter to measure at pin 1 of Tuner.

Supply a TV-signal, with a frequency of 475.25 MHz and a signal-strength of about 2 mV. Measure the DC-voltage on pin 1 of the Tuner (position 1200). With the 'Tuner AGC'-alignment in the SAM-menu, this voltage can be aligned. Alignment is correct when DC-voltage is just below 3.5 V.

***'Blend intensity'***

(This alignment could be used when micro controller or HOP-IC has been replaced).

It aligns the level of transparency of the menu-picture blended into the main-picture.

1. Position the brightness-, contrast- and colour setting in the middle position (picture-menu).
2. Apply a signal with a 100 % white video-pattern.
3. Connect an oscilloscope to pin 7 of connector 0340 of the CRT panel and measure the Red output level.
4. Align 'blending intensity'-parameter such that the blended signal is 65 % of the black-white amplitude. Practically this will be about 1.3 V (blended signal) versus 2 V (full white signal).
5. The parameter can be adjusted in between 0 and 31.

***'Adjust Peak White Limiter'***

Depending on the picture-tube size, the next value of the table must be entered:

| Peak White Limiter | |
|---|---|
| 25" FS | 4 |
| 28" FS | 4 |
| 29" SF | 4 |
| 24" WS | 4 |
| 28" WS | 4 |
| 32" WS | 4 |

***'Vg2 Test Pattern'***

Here the Vg2 Test pattern can be switched on.

### 8.5.3 'Normal Geometry' alignments in the Service Alignment Menu

Warning: At this moment, the 'INTERNAL TEST PATTERN' of the set software will lead to a mis-alignment of the picture geometry. Therefor use an external generator with a geometry pattern (e.g. crosshatch) to align the set (only for the 'Vertical slope' adjustment the internal test pattern can be used).

***'Vertical slope'***

Select 'Test Pattern on' (read warning above).

1. Set the start conditions for 16:9 sets: ~~'V. S-correction' value on 8 for the 28" and on 7 for the 32" set.~~ The boundary-stripes of the test pattern should be positioned on the edge of the picture tube.
2. Align 'V. slope' (when aligning the below half of the picture is blanked). The middle line of the test pattern must be matched with the edge of this blanking/picture transient in the middle of the picture. Pushing 'MENU' button again, gives you previous menu again. (This alignment is meant to align the zero crossing of the frame-deflection to the mechanical middle of the picture tube.)

***'Horizontal amplitude and centring'***

Use an external pattern generator with a geometry pattern (e.g. crosshatch).

1. Using 'H. amplitude' align the horizontal amplitude so that the entire test pattern is visible.
2. Use an external test signal, with a centre-reference from a service-generator. Use 'H shift' to align the picture horizontally in the middle.
3. Repeat the 'H amplitude' alignment if necessary.

***'East/west alignment'***

Use an external pattern generator with a geometry pattern (e.g. crosshatch).

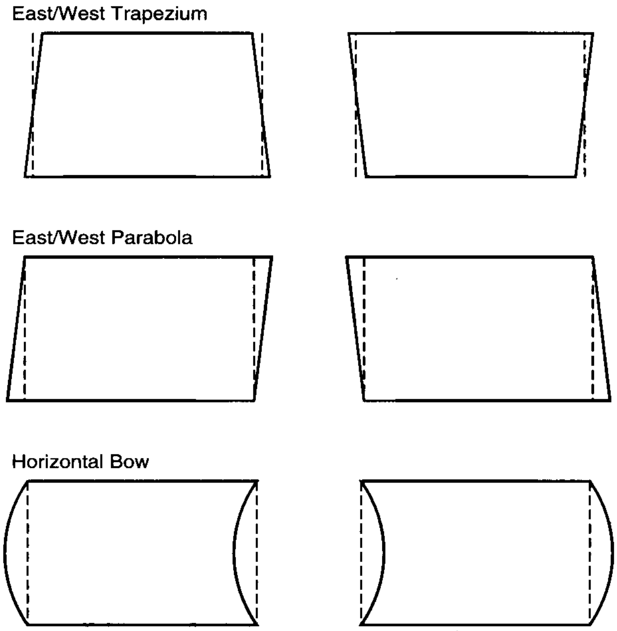


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**Figure 8-3**

1. Use 'East/West Parabola' to align the vertical lines until straight.
2. 'Upper East/West corner' to align the vertical lines in the upper corners until straight.
3. 'Lower East/West corner' to align the vertical lines in the lower corners until straight.
4. Use 'East/West Trapezium' to align for a rectangular.
5. Use 'Horizontal Parallelogram' to align for straight vertical lines if necessary.
6. Horizontal Bow' (neutral value 31. With this alignment the E/W parabola can be corrected such that it becomes symmetrical).

Repeat steps 1 to 6 if necessary.

### 8.5.4 'Super wide geometry' alignments (for widescreen sets) in the Service Alignment Menu

The header of this paragraph and also the menu's are somewhat misleading. We only need to set the following values (if the normal geometry alignment has been performed correctly):

1. ~~V. S-Correction: enter value of 'normal geometry' alignment.~~
2. H. amplitude: enter value of 'normal geometry' alignment subtracted by 4.
3. East/west Parabola: enter value of 'normal geometry' alignment.

## 8.6 Option menu

### 8.6.1 Introduction:

The microprocessor communicates with a large number of $I^2C$-IC's in the set. To ensure good communication and make digital diagnosis possible, the microprocessor has to know which IC's have to be addressed. The presence of specific IC's or functions is made known by means of the option codes.

All options codes can be manipulated using both the option numbers and/or the Option menu.

All hardware related options are incorporated under the heading 'Options' of the 'Alignments' sub-menu of the 'Service Alignment Mode'. All software related options that are incorporated under the heading 'Dealer Options' of the 'Service Alignment Mode", can also be reached directly via the 'DEALER' button of the DST.

### 8.6.2 Options in the Service Alignment Mode

| Menu-item | Subjects | Options | Physically in the set |
|---|---|---|---|
| Dual screen/PIP | Aux type | Yes | Dual Screen / PIP module present |
| | | No | Dual Screen / PIP module not present |
| Teletext/EPG | TXT | Yes | Teletext present |
| | | No | Teletext not present |
| | NextView present | Yes | NextView set |
| | | No | NextView not set |
| | NextView type | Flashram | Flash-RAM present |
| | | No Flashram | Flash-RAM present |
| Communication | Easylink Plus | Yes | Easylink Plus set |
| | | No | Easylink Plus not set |
| Picture Tube | CRT Type | 4:3 | 4:3 picture tube |
| | | 16:9 | 16:9 picture tube |
| | Picture Rotation | Yes | Frame rotation circuitry present (diagram **A4**) |
| | | No | Frame rotation circuitry not present |
| | Dynamic focus | Yes | Dynamic focus picture tube present |
| | | No | Dynamic focus picture tube not present |
| | Dooming prevent | Off | |
| | | 4:3 | |
| | | SF 16:9 | |
| | | RF 16:9 | |
| Video repro | Featurebox type | Eco | PROZONIC not present |
| | | Prozonic | PROZONIC present |
| | Field memories | 2 | |
| | | 3 | |
| | Lightsensor | Yes | Lightsensor present |
| | | No | Lightsensor not present |
| | PALplus | Yes | PALplus module present |
| | | No | PALplus module not present |
| | Combfilter | Yes | Not valid for Europe |
| | | No | |
| | Picture improvement | Yes | |
| | | No | |
| | Picnic | Yes | PICNIC present |
| | | No | PICNIC not present |
| | Picnic AGC | Yes | In normal operation: Yes |
| | | No | During 'Drive' alignments: No |
| | Signalling bits | Yes | |
| | | No | |
| Source Selection | External 3 | Yes | 3rd EURO connector present |
| | | No | No 3rd EURO connector present |
| | External 4 | Yes | 4th EURO connector present |
| | | No | No 4th EURO connector present |
| Audio Repro | Dolby | None | |
| | | Pro Logic | |
| | Rear speakers | Corded | Passive surroundbox present |
| | | Virtual | |
| | | Cordless | Active surroundbox present |
| | Acoustic system | FL7 | Applicable for sets with subwoofer |
| | | FL8 | Applicable for sets without subwoofer |
| | | FL9 Monitor | Monitor look (only tweeters at both sides) |
| | | FL9 DAS | FL9 with full range speakers at both sides |
| | MSP type | MSP3411 | |
| | | MSP3415 | |
| | | MSP3451 | |
| | AVL enable | On | |
| | | Off | |
| Miscellaneous | Heatsink Present | Yes | Heatsink present on CRT/SCAVEM panel (diagram F) |
| | | No | Heatsink not present on CRT/SCAVEM panel (diagram **F**) |
| | Tuner type | UV1316 | |
| | | TEDE9 | |

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### 8.6.3 Dealer Options in the Service Alignment Mode

- After the option(s) have been changed, they must be stored via the 'STORE' command.
- The new option is only active after the TV is switched off and then back on again using the mains switch (the EAROM is then read out again).

### 8.6.4 Option number

In case the EAROM has to be replaced, all the options will also require resetting. To be certain that the factory settings are reproduced exactly, both option numbers have to be set. These numbers can be found on a sticker on the picture tube.

Example: Option number 28PT7306/12 could be:
04929 04418 04417 00016
08199 00001 00000 00000

The first line indicates the hardware options 1 to 4, second line is reserved for the software options.
Every 5-digit number represents 16 bits (so maximum number can be 65536 if all options are set).

| Bit | HW1 | HW2 | HW3 | HW4 | SW1 | SW2 | SW3 | SW4 |
|---|---|---|---|---|---|---|---|---|
| 0 (1) | FBX (1) | | EXT3 | MSP (8) | Auto TV | CTI | | |
| 1 (2) | FBX (1) | Dolby PL | EXT4 | MSP (8) | Auto Store mode (10) | | | |
| 2 (4) | FBX (1) | Virtual rear spkrs | | China IF | Auto Store mode (10) | | | |
| 3 (8) | Combfilter | Cordless rear spkrs | | Tuner (9) | | | | |
| 4 (16) | PAL-Plus | Dolby Digital | Dual Screen (6) | TXT | Picture mute | | | SLDP (13) |
| 5 (32) | Field mem. (2) | | Dual Screen (6) | China TXT | Demo | | | SLDP (13) |
| 6 (64) | Light sensor | Cabinet (4) | TXT-EPG-DS | | Virgin | | | AVL |
| 7 (128) | LTP | Cabinet (4) | Aux-headphone | | | | | |
| 8 (256) | PICNIC | P50 | Aspect Ratio (7) | | | | | |
| 9 (512) | PICNIC-AGC | | Tilt | | | | | |
| 10 (1024) | | | DAF | | | | | |
| 11 (2048) | LNA (3) | | | | | | | |
| 12 (4096) | WSS | EPG | Heatsink | | TXT pref. (11) | | | |
| 13 (8192) | Time constant | EPG type (5) | Home Cinema | | TXT region (12) | | | |
| 14 (16384) | | | | | | | | |
| 15 (32768) | | | | | | | | |

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All bits can be set 'On' (= 1) when the option is available or 'Off' (= 0) when it is not, except for:
(1) 0 = Eco, 1 = PROZONIC, 4 = Eco-DNR.
(2) 0 = 2 Field memories, 32 = 3 Field memories.
(3) 0 = Normal, 8192 = Fast.
(4) 0 = FL7, 64 = FL8, 128 = FL9.
(5) 0 = Type 2, 8192 = Type 2C3.
(6) 0 = None, 16 = PIP, 32 = Dual Screen.
(7) 0 = 4:3, 256 = 16:9.
(8) 0 = MSP3415, 1 = MSP3451, 2 = MSP3411.
(9) 0 = Philips, 8 = Alps.
(10) 0 = None, 2 = PDC/VPS, 4 = TXT-Page, 6 = PDC/VPS/TXT-Page.
(11) 0 = TOP, 4096 = FLOF.
(12) 0 = East, 8192 = West.
(13) 0 = Off, 16 = 4:3, 32 = SF16:9, 48 = RF16:9.
When all the correct options are set, the sum of the decimal value (between brackets in 1st column) of each column will give the option number.

# 9. Circuit descriptions and abbreviation list

## 9.1 Circuit descriptions

The following circuits are described:

1. Introduction
2. Block diagrams
3. Power supply
4. Control
5. Tuner & IF
6. Video: High-end Input Processor
7. Video: Feature box
8. Video: High-end Output Processor
9. Synchronisation
10. Horizontal deflection
11. Vertical deflection
12. Audio
13. Teletext / NexTView
14. CRT / SCAVEM / Rotation
15. Software related features

### 9.1.1 Introduction

The EM2E Europe is a lower specified MG-chassis. EM stands for Eco-MG, 2 for the used processor (1 = Painter, 2 = OTC) and E stands for Europe. This will be, at the moment of launch, the cheapest realised 100 Hz set.

The architecture consist of a conventional large signal panel (LSP) and a small signal board (SSB) module, placed into a so called SIMM-connector (Standard Interface, 80 pins).

The LSP is built up very conventional, with hardly any surface mounted components on the copper side. Difference with the MG-chassis is that the EM2E LSP has a very large 'hot' part, including the deflection coil.

The SSB is a high tech module (2 sides reflow technology, full SMC) with very high component density and complete shielding for EMC-reasons. Despite this, it is designed in such a way, that repair on component level will be possible. To achieve this, attention has been paid to:

- The position of service test lands (Tuner side).
- Accessibility (Tuner side).
- Clearance around surface mounted IC's (for replacing).
- Diagnostics & Fault Finding via ComPair.

Due to the low amount of cabling etc., expectation is that the FCR will be low.

Attention: During the first 4 to 6 months of production, the EM2E set-software will be integrated into a flash-RAM on the SSB. After that period, a mask-ROM will be used. Which IC is used is not of interest for service, but for both solutions it means that Service Workshops must be equipped with dedicated (de)solder equipment for exchanging these IC's.
In case flash-RAM or mask-ROM has to be replaced in the field, dealer will receive always an up-to-date flash-RAM.

Warning: Be aware that half of the LSP-circuitry is 'hot', including the deflection coil.

Protection: The start-up behaviour of the EM2E is different then that of the MG-chassis, meaning that there does not exist a situation as in the MG where we have 'supply ON / deflection circuit OFF'.
This means that isolating failures in the EM2E must be done in a different way. See Chapter 5 of this manual.

### 9.1.2 Block diagrams

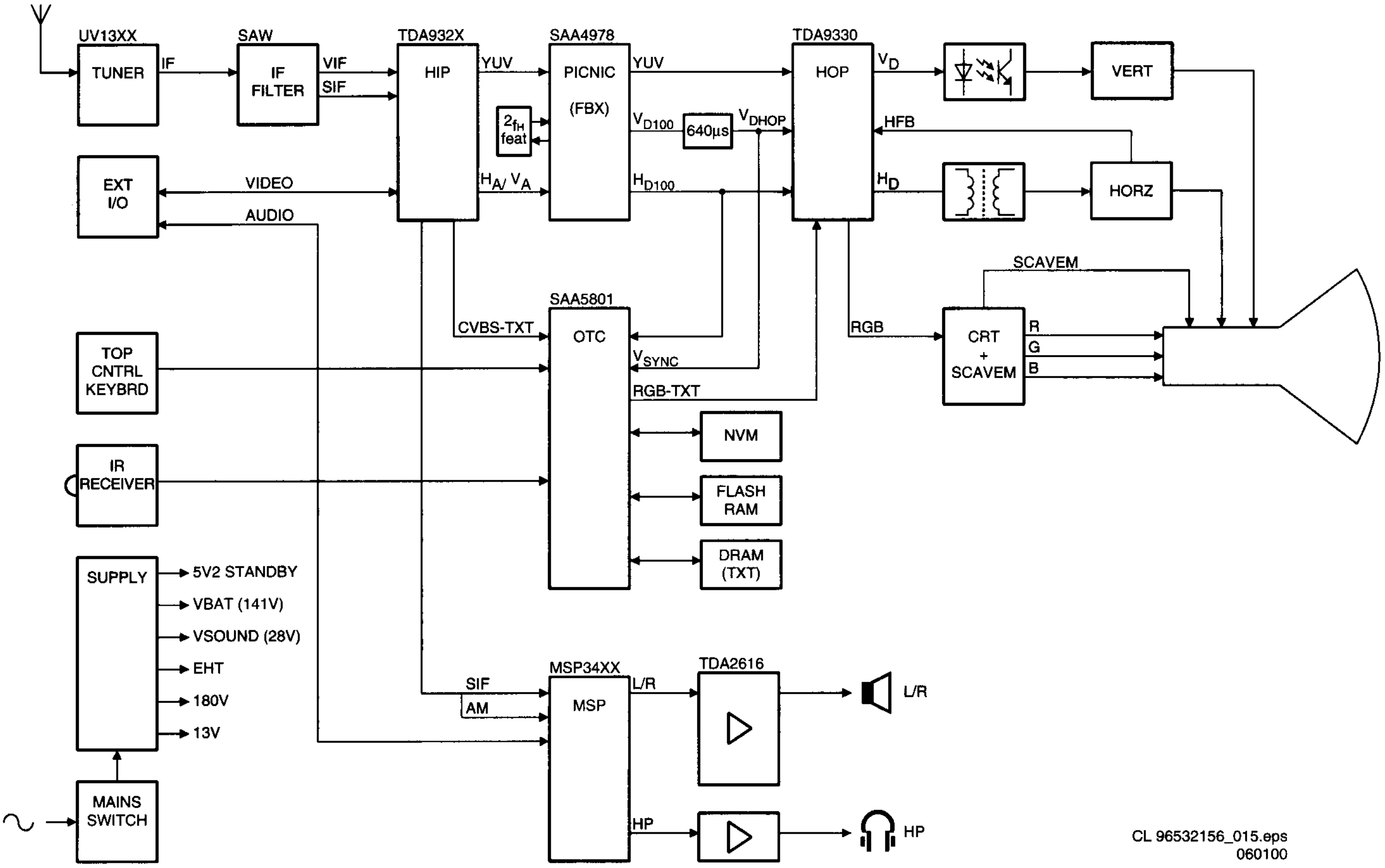
UV13XX
TUNER
IF
SAW
IF FILTER
VIF
SIF
TDA932X
HIP
YUV
2fH feat
SAA4978
PICNIC (FBX)
YUV
VD100
640µs
VDHOP
HA/ VA
HD100
TDA9330
HOP
VD
HFB
HD
VERT
HORZ
SCAVEM
EXT I/O
VIDEO
AUDIO
SAA5801
CVBS-TXT
OTC
VSYNC
RGB-TXT
RGB
CRT + SCAVEM
R
G
B
TOP CNTRL KEYBRD
IR RECEIVER
NVM
FLASH RAM
DRAM (TXT)
SUPPLY
5V2 STANDBY
VBAT (141V)
VSOUND (28V)
EHT
180V
13V
MAINS SWITCH
MSP34XX
SIF
AM
MSP
L/R
HP
TDA2616
L/R
HP
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Figure 9-1

The tuner type UV1316 is a PLL tuner and delivers the IF-signal, via audio & video SAW-filters, to the HIP (High-end Input Processor). The HIP has the following functions:

- IF modulation.
- Video source- and record select.
- Colour decoder.
- Synchronisation.

Two SCART-connectors can be used: SCART1 is fully equipped and SCART2 is meant for VCR. Pin 10 of SCART2 is used for Easylink and there is a possibility for Y/C in. The CVBS-out on pin 19 can be used for WYSIWYR (What You See Is What You Record).

The HIP delivers the signal to the PICNIC. This IC takes care of:

- Analogue to Digital conversion and vice versa.
- 50 to 100 Hz conversion.
- Panorama mode.
- Noise reduction.
- Dynamic contrast.

For Digital Scan the PROZONIC is required, which can be connected to the PICNIC. This IC is mentioned as 2fH features in the blockdiagram.

After the PICNIC the, now 100 Hz, YUV- and H/V-signals are fed to the HOP (High-end Output Processor). This IC handles the video control and geometry part. The RGB-signals from TXT/OSD are also inserted via the HOP. The video part delivers the RGB signals to the CRT-panel and the geometry part delivers the H-drive, V-drive and also a drive-signal for rotation (as a variable DC-level on the V-drive signal).

Both deflection circuits are 'hot' and located on the LSP and are driven by the HOP. To make the galvanic separation, the line drive is driven via transformer 5410 and the framedrive via optocoupler 7610.The horizontal output stage generates some supply voltages, the EHT-, focus- and Vg2-voltages.

The RGB amplifiers on the CRT-panel are integrated in one IC and are supplied with 180 V from the LOT.
The SCAVEM circuit modulates transitions of the Luminance (Y) signal on the horizontal deflection current, giving a sharper picture.

The sound part is built around the MSP34xx (Multichannel Sound Processor) for IF sound detection, sound control and source selection. Dolby decoding is also done by the MSP. Amplification is done via an integrated power amplifier IC, the TDA2616.

The microprocessor, called OTC (OSD, Teletext and Control), takes care of the analogue TXT input- and output processing. The OTC, ROM and RAM are supplied with 3.3 V, which is derived from the +5VSTANDBY.
The NVM (Non Volatile Memory) is used to store the settings, the FLASH RAM contains the set software and the DRAM is used for storing the Teletext pages.

In EM2E there is a separate Standby Supply in order to reduce the Standby power consumption. During Standby, the Main Supply is switched off (via TS7529). A relay is used to switch the Degaussing circuit.

The Main Supply, a SMPS based on the 'down-converter' principle, generates the 141 V ($V_{BAT}$) and the 28 V for the audio part.
Difference with former MG-sets is that $V_{BAT}$ is not mains isolated (is 'hot') and is alignment free.

### 9.1.3 Power supply (diagram A1 & A2)

***General***
The power supply has a number of main functions. These functions are dealt with in succession:

- Mains filter
- Degaussing picture tube
- Standby power supply
- Main supply

***Mains filter (diagram A1)***

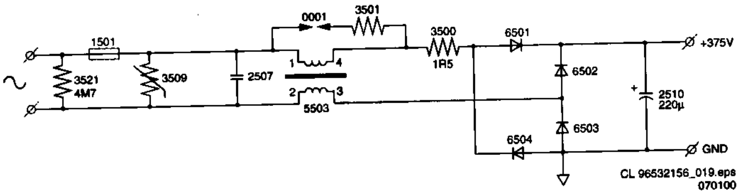

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Figure 9-2

The mains filter has 2 functions: it prevents high-frequency signals to be transferred into the mains and it protects the set from lightning damage.

C2507 prevents the high-frequency signals, generated by the set, to be conveyed into the mains by short-circuiting them.

In case of a lightning surge between the 2 phases (differential mode) the energy is immediately bled away through the VDR (R3509) to the other phase.
In case of a lightning surge on both phases of the mains in relation to the aerial earth, the mains filter acts as a high resistance ($U_{EMK}$=L * dI/dt) as a result of which the voltage across coil L5503/04 increases. A spark gap (0001) prevents that the voltage increases too much, which would lead to a damaged coil. When ignited, the current will be discharged via this spark gap.
The two networks using R3503//0002 and R3502//0003 are also used for lightning protection. They lead the energy of a common-mode lightning surge from the 'cold' to the 'hot' side in case of insertion on the aerial or from the 'hot' to the 'cold' side in case of insertion via the mains-input.
Resistor R3500 is used for limiting the inrush-current.

For 240 $V_{AC}$ mains-voltage applications, jumper 9502 is used. Diodes 6501 to 6504 now work as bridge rectifier charging C2510. For 110 $V_{AC}$ mains-voltage applications, i.s.o. jumper 9502, jumpers 9503 and 9504 are used. Now the diodes will work as a voltage doubler charging C2516 and C2517 (not implemented for Europe).

***Degaussing picture tube (diagram A1)***
After switching 'ON' the set via the mains-switch, the DEGAUSS_INPUT signal from the processor (OTC) will be made high, transistor 7528 will conduct and relay 1002 will be activated. Initially a considerable current will flow, via PTC 3516, through the degaussing coil. The PTC will heat up, resistance will rise and the current will decay rapidly. The OTC will switch off the relay after 12 seconds.

***Standby power supply (diagram A2)***
This power supply is of a SOPS type (Self-Oscillating Power Supply) and is regulated by the controlled switching of an oscillator. It uses the so-called 'Flyback' principle:

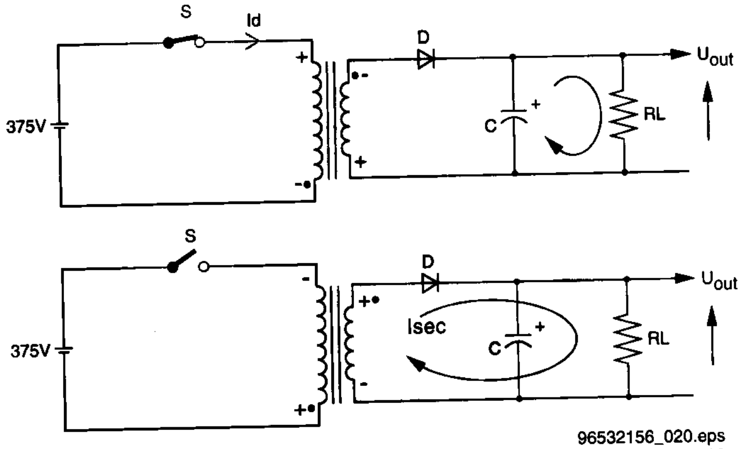

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Figure 9-3

- After closing switch 'S', the current $I_D$ will increase linear in time. The magnetic energy in the primary coil is directly proportional with the self-inductance of the coil and current $I_D$ (thus with the time the switch is closed). The voltage polarity at the secondary winding is negative (due to different winding direction), meaning that diode D will block. Capacitor C will discharge via $R_L$, $U_{OUT}$ will decrease.
- Opening switch 'S' will generate a counter-e.m.f. in the primary winding, trying to maintain current $I_D$. Through this the polarity of the secondary voltage will inverse. The magnetic energy, stored in the coil, will now be transformed to the secondary side. Diode D will now conduct, capacitor C will be charged and $U_{OUT}$ will increase.

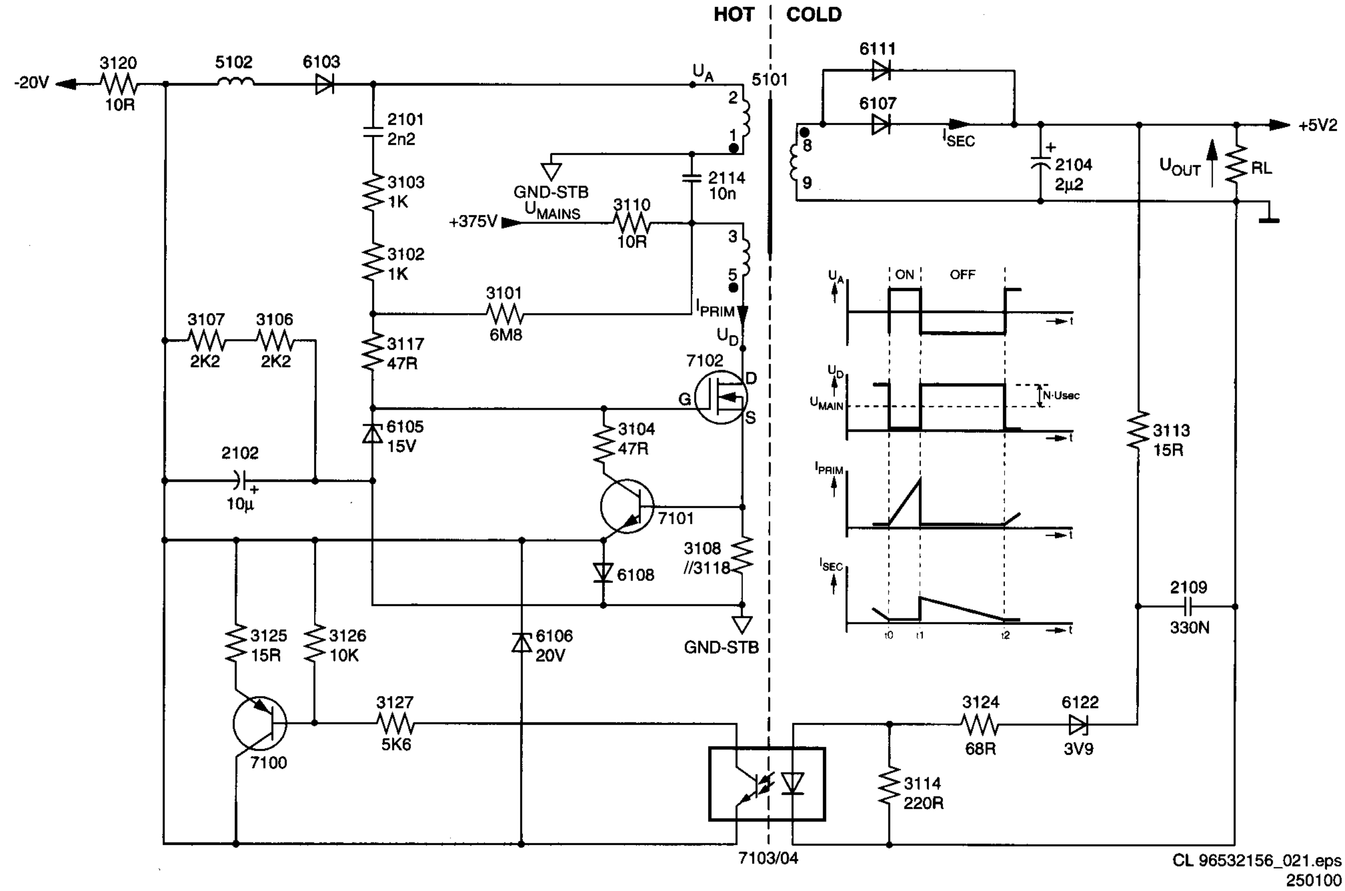
HOT
COLD
-20V
3120
10R
5102
6103
$U_A$
5101
6111
6107
$I_{SEC}$
+5V2
2101
2n2
3103
1K
GND-STB
$U_{MAINS}$
+375V
3110
10R
2114
10n
2104
2μ2
$U_{OUT}$
RL
3102
1K
3101
6M8
$I_{PRIM}$
$U_D$
7102
G
D
S
3107
3106
2K2
2K2
3117
47R
6105
15V
3104
47R
2102
10μ
7101
3108
//3118
6108
GND-STB
3113
15R
2109
330N
3125
15R
3126
10K
6106
20V
3127
5K6
7100
3124
68R
6122
3V9
3114
220R
7103/04
ON
OFF
N·Usec
$U_{MAIN}$
$I_{PRIM}$
$I_{SEC}$
t0
t1
t2
t
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Figure 9-4

To apply this on the EM2E (diagram A2): replace Switch 'S' by FET TS7102, coil L by L5101, diode D by D6107//D6111 and C by C2104.

Time interval t0 - t1:
After switching on the set, the gate of MOSFET TS7102 will be high (max. 15 V due to zenerdiode D6105). This will drive the FET into saturation ($U_{DS}$ = 0 V). The DC-voltage $U_{MAINS}$ will be transposed across the primary winding of L5101 (3, 5) resulting in a linear increasing current through this coil.
The voltage across the co-coupled coil (1, 2) is also positive and will keep the FET into conductivity via C2101, R3103, R3102 and R3117 for some time. The slope of the primary current is determined by the self-induction of the coil and on the magnitude of the supply voltage (+375 V).
The maximum current is determined by the time the FET stays into conductance (t0 - t1). This time is directly determined by the voltage across R3108//R3118. This voltage is a measure of the current and if it exceeds 1.4 V, TS7101 will be driven into conductivity and consequently connect the gate of TS7102 to earth; the FET will block. The current will be: 1.4 V / (15//4.7 ohm) = 0.39 A.
The voltage across the secondary winding (8,9) will be negative, diodes D6111 and D6107 will block.

Time interval t1 - t2:
The sudden current interruption in the primary coil, will induce a counter-e.m.f. that wants to maintain the current. The voltage on the drain of the FET will increase. The secondary voltage (8, 9) will become positive and will charge C2104 via D6107 and D6111. All energy that was stored in L5101 during t0 - t1 will be transferred into the load. Due to the transformer principle, a voltage will now be induced in the primary winding (3, 5) and the co-coupled winding (1, 2). This voltage will be: N * $U_{SEC}$ (N = winding ratio).
The voltage across the co-coupled coil will be negative, keeping the FET blocked.

Time t2:
At t2, the current through the secondary coil will be reduced to zero, as C2104 is no longer charged. As a consequence, the voltages will decay and will change polarity. The gate of the FET will be again made positive, is driven into conductivity and the cycle starts again.

Feedback, stabilisation:
The Standby Power Supply always oscillates at maximum power, the only limiting factor is the maximum primary current which has been pre-set with R3108//3118.
$U_{OUT}$ is determined by R3114, R3124 and zenerdiode D6122. If the voltage across R3114 exceeds the threshold voltage of the diode of the optocoupler 7104 (±1 V) or, in other words, $U_{OUT}$ exceeds 5.2 V, the transistor of the optocoupler will conduct.
Transistor TS7100 will be driven and a negative voltage will be transposed to the emitter of TS7101. When TS7101 conducts, the gate of the FET is at earth potential forcing the oscillator stop. Due to the load, the secondary voltage $U_{OUT}$ will decrease. At a certain voltage, optocoupler TS7103/04 will block and the oscillator will start again.
Since there are no capacitors and there is a high amplification-factor in the feedback circuit, the feedback is ultra-fast. This is why the ripple on $U_{OUT}$ is minimal. The negative supply voltage (-20 V) used in the feedback circuit originates from the co-coupling coil and is rectified through D6103.
Stabilisation is not effected through duty-cycle control but through burst-mode of TS7100.
Burst-mode is load dependent. If the power supply is less loaded, the secondary voltage will have the tendency to increase more rapidly. If the load on the power supply

increases, then the oscillator stops less often, right up to the moment that the oscillator is operating continuously: maximum load. If the power supply is now loaded even more, the output voltage will decay. The maximum load is determined by the maximum primary current set by R3108//3118.

Protection:
If the optocoupler would fail, the secondary voltage will increase. This would have disastrous consequences since many IC's (e.g. OTC, flash-RAM, DRAM) are fed with this 5.2 V. In other words, very expensive repairs would be required. We already know that the negative supply is directly dependent upon the secondary 5.2 V, as a consequence of which the negative supply will increase proportionally as the secondary voltage increases.
If the negative supply in the mean time reaches -30 V, D6106 will start to zener and as a consequence TS7101 will start conducting. Basically, D6106 will take over the stabilisation task of the optocoupler, however, with a considerable spread: from -20 V to -30 V is a 50 % increase, thus $U_{OUT}$ will increase from 5.2 V to max. 7.5 V.

### *Main supply (diagram A1)*

Some important notes on beforehand:
- $V_{BAT}$ is not isolated from the mains supply ('hot').
- $V_{BAT}$ is alignment free.

The Main Power Supply, generates the 141 V ($V_{BAT}$) and the 28 V for the audio part and is based on the so-called 'down converter' principle.

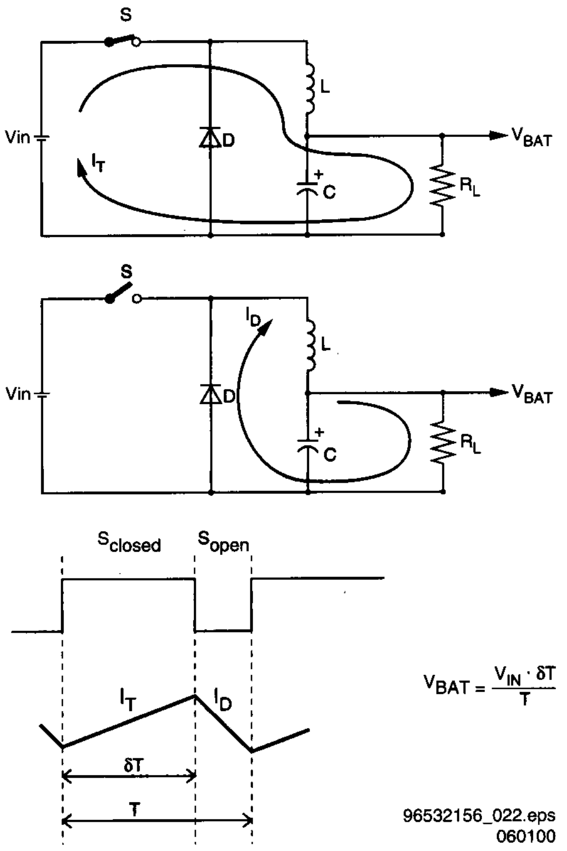

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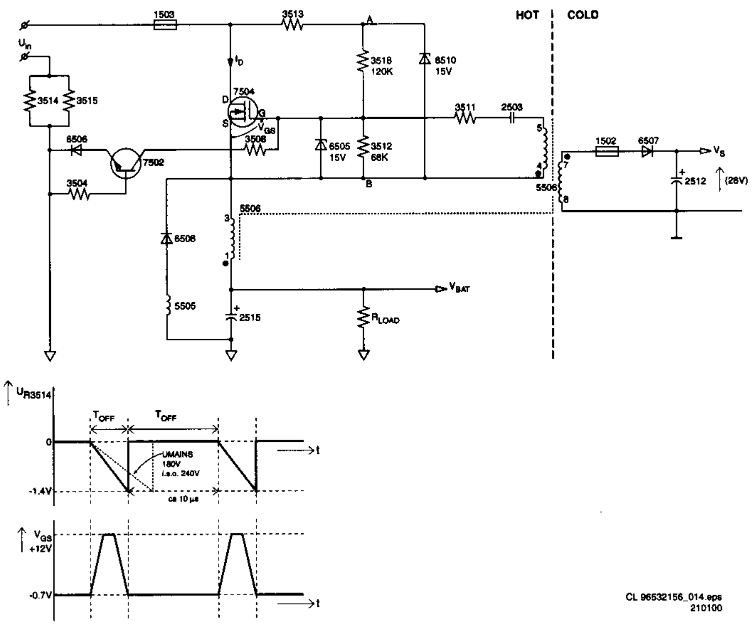
Figure 9-5

- After closing switch 'S', the linear in time increasing current $I_T$, , will charge capacitor C.
- Opening switch 'S' will generate a counter-e.m.f. in coil L, trying to maintain current $I_T$. This is possible via diode D (this diode is also called 'freewheel diode'). So after opening 'S', the magnetic energy stored in coil L will be transferred to electrostatic energy in capacitor C. The $V_{IN}$ will only supply current during the time that 'S' is closed while a constant current is flowing through $R_L$.
- $V_{BAT}$ is directly proportional with $V_{IN}$ and the time that 'S' is closed and reverse proportional with period time 'T'. So by changing the duty cycle, it will be possible to control $V_{BAT}$.



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210100

Figure 9-6

At start-up of the main supply, C2515 can be assumed as being a shortcircuit. $U_{AB}$ will be 15 V (R3513, D6510) and $U_{GS}$ of the FET will be +5.4 V (voltage division over R3512 and R3518). The FET will be driven into saturation (same as closing switch 'S' ). The drain-current will increase linear in time. With other words: resistors R3513 and R3518 will start the oscillator. The voltage across the co-coupled coil (4, 5) is also positive and will keep the FET into conductivity.

The drain-current will also flow through R3514//R3515. The voltage on the base of TS7502 will be +0.8 V due to the stabilisation circuit (which is explained further). At increasing current, the emitter-voltage of TS7502 will get more negative. When this voltage reaches -0.7 V, TS7502 will be driven into conductivity and consequently connect the gate of TS7504 to earth; the FET will block (same as opening switch 'S'). The maximum drain-current is: 0.7 V / (R3514//R3515) = 1.4 A. The voltage polarities on L5506 will invert, keeping the gate of TS7504 negative via the co-coupled coil (4, 5). The voltage on the secondary winding of L5506 (7, 8) will be positive, generating the +28 V audio supply voltage via D6507 and C2512.

The sudden current interruption in the primary coil, will induce a counter-e.m.f. that wants to maintain the current via the 'freewheel' diode D6508. This current is linear decreasing in time and as it is also flowing through R3414//R3415, TS7502 will be blocked after a certain time period. The gate of the FET will be again made positive, is driven into conductivity and the cycle starts again.

Stabilisation of $V_{BAT}$:
The output voltage $V_{BAT}$ will be determined by: $V_{BAT} = V_{IN} * T_{ON} / (T_{ON} + T_{OFF}) = V_{IN} *$ duty-cycle.
To stabilise the output voltage, a feedback loop is implemented, which will reduce $T_{ON}$ when $V_{BAT}$ increases and vice versa.

Via a voltage divider, excisting of (1 %) resistors R3507, R3510 and R3527, a voltage of 2.5 V (when $V_{BAT}$ = 141 V) is fed to the input of precision shunt regulator 7506. This regulator will conduct, a current will flow through R3524 and TS7505 will be driven into conductivity. The base of TS7502 will now be set at a certain positive voltage. As this transistor switches the FET TS7504 on and off, this circuit can determine the dutycycle.

E.g. when the load increases, $V_{BAT}$ will decrease. As a consequence, the input-voltage of regulator 7506 will decrease, resulting in a lower current. Through that the emitter-base voltage of TS7505 will diminish.
The current through R3504 will decline, changing the base-voltage of TS7502 and through that the $T_{ON}$ (will increase) of the FET. The output voltage $V_{BAT}$ will rise.
If the load continues to increase, the regulator will block at a certain moment, the collector-current of TS7505 will now be zero. If there flows no current through R3504, $T_{ON}$ will now be maximum ($I_{MAX}$ = 1.4 A). This is the point where $V_{BAT}$ will be below 141 V, and at further increasing load will be switched off (The voltage across the co-coupled coil (4, 5) will decrease due to the increasing load. Therefore the voltage on the gate of TS7504 comes below the threshold voltage. The supply switches off and an audible hiccuping can be heard).

On the other hand when the load decreases, $V_{BAT}$ will rise. As a consequence, the input-voltage of 7506 will also rise resulting in a higher current. The current through R3504 will rise, changing the base-voltage of TS7502 and through that the $T_{ON}$ (will decrease) of the FET. The output voltage $V_{BAT}$ will be reduced.

If, for instance, $V_{IN}$ will decrease (e.g. $U_{MAINS}$ is 180 V i.s.o. 240 V), the slope of the drain-current will be flattened, through which the FET will be longer into conductance, keeping $V_{OUT}$ constant.

If, for any reason, the stabilisation circuit might fail, the output voltage $V_{BAT}$ can never exceed 200 V (via D6514). D6514 will form a shortcircuit, $V_{BAT}$ will drop and the set will switch off (this will result in an audible hiccuping of the supply).

Set to 'STANDBY" (via RC):
When the set is switched to 'STANDBY' via the Remote Control, the Main supply will be switched off.
This is done by the circuit around TS7529 (see diagram A1): During 'ON'-state the Main supply is fed with line pulses via the STANDBY line. They are rectified and smoothed via D6517, D6516 and C2530 and fed to TS7529. Because they are less than -20 V, this transistor will be blocked.
When these pulses are stopped (STANDBY), TS7529 will be saturated and TS7502 will be switched off. This will switch off the Main supply.

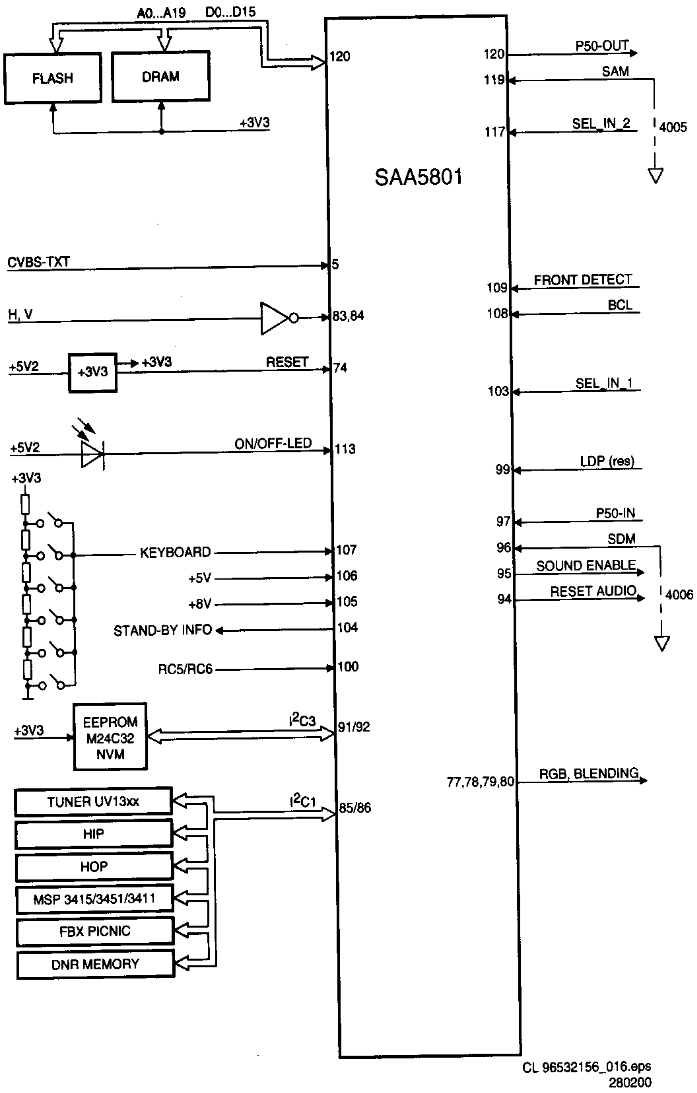
Set to 'ON' (via 'STANDBY'):
At the moment the set is switched 'ON', the HOP is not working (as much as possible IC's are made voltageless during 'STANDBY'). Therefore it is impossible that the STANDBY line carries line-pulses, so the main supply cannot start up. This problem is solved via the 'low power start-up' possibility of the HOP.
Via pin 22, the HOP receives, via the STANDBY_INFO line from the OTC, a voltage of 5.2 V coming from the Standby supply. The result will be that the HOP will generate pulses with a nominal $T_{OFF}$ and $T_{ON}$ growing from 0 to 30 % of the nominal value.
This signal is unchanged until the Main supply is switched 'ON' and the HOP the correct $I^2$C-command POR-bit) has received.

Guarding circuit:
The negative pulses on the secondary winding of L5506 are rectified by D6520 and smoothed by C2535. The resulting negative DC-voltage will keep TS7510 blocked, even as TS7511.
When something happens in the Main supply through which these pulses will decrease, the DC-voltage will increase. TS7510 starts to conduct, even as TS7511. Via R3541 and D6522 this situation will be maintained (thyristor principle). The collector of TS7511 drives via R3538 a positive pulse back to the OTC (named STANDBY(POR)). The OTC will now switch off the Main supply via the STANDBY_INFO signal.

### *SSB*

There are 5 different voltages located on the SSB: +33 V, +11D V, +8 V, +5.2 V and +5 V.
+5.2 V is the Standby voltage, it should always be present. The 8 V is derived from the 11D V with stabiliser 7906. The 11D voltage is only present when the line-drive pulses start the deflection.
The 8 V is used to switch the +5.2 V with transistor 7905 to supply the +5 V.

### 9.1.4 Control (diagram B5)


A0...A19
D0...D15
FLASH
DRAM
+3V3
120
SAA5801
CVBS-TXT
5
H, V
83,84
+5V2
+3V3
+3V3
RESET
74
+5V2
ON/OFF-LED
113
+3V3
KEYBOARD
107
+5V
106
+8V
105
STAND-BY INFO
104
RC5/RC6
100
+3V3
EEPROM
M24C32
NVM
$I^2C3$
91/92
TUNER UV13xx
HIP
HOP
MSP 3415/3451/3411
FBX PICNIC
DNR MEMORY
$I^2C1$
85/86
120
P50-OUT
119
SAM
117
SEL_IN_2
4005
109
FRONT DETECT
108
BCL
103
SEL_IN_1
99
LDP (res)
97
P50-IN
96
SDM
95
SOUND ENABLE
94
RESET AUDIO
4006
77,78,79,80
RGB, BLENDING
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280200

Figure 9-7

***OTC***

The SAA5801 (IC7001) is called the OTC (OSD, TXT and Control). In this IC, the microprocessor and the TXT-decoder (level 2.5) are integrated.

Some of its functions are:

- Set control.
- TXT/OSD acquisition.
- RGB-outputs to the HOP
- Menu blending; for blending the contrast is software controlled.
- I/O-ports for $I^2C$, RC5, LED, and service modes.
- Error code generation.

The software for EM2E can be 2 MB (Megabyte).

For TXT-data 1000 pages can be stored in IC7007. This is a DRAM of 4 Mbit and this IC is also used to store data of a working set.

The Non Volatile Memory IC7011 is a 4 kB version M24C32W6.

All ICs in this part are supplied with 3V3. For this voltage a 3V3 stabiliser is used (IC7005).

When the 3.3 V is available, a POR is generated with TS7003/7004 to wake up the OTC. During the reset all I/O pins are high. When a POR is generated the TV-set is in Standby mode.

Via pins 105 and 106 the 8 V and the 5 V are sensed. If one of them is not present, the Main supply is switched off (set in protection and the red LED will blink at 3 Hz). The OTC will generate an error code to indicate what was wrong.

The horizontal (HD100) and vertical (VSYNC) sync pulses are also fed to the OTC for stable OSD and TXT.

The RGB-outputs (77/78/79) together with fading (pin 80) are fed to the HOP. The fading pin has a double function: it is used for making a transparent menu and as fast-blanking signal for TXT.

***$I^2C$-busses***

In the EM2E-chassis with OTC-processor there are two $I^2C$-busses used:

- Slow (max. 100 kHz) hardware $I^2C$-bus (called $I^2C1$), used for all IC communication.
- Separate short bus (called $I^2C3$) for the Non Volatile Memory (NVM) to avoid data corruption.

***NVM***

The Non Volatile Memory contains all set related data that must be kept permanently, such as:

- Software identification.
- Operational hours.
- Error-codes.
- Option codes.
- All factory alignments.
- Last Status items for the customer + a complete factory recall.
- Txt featuring (keeping habit watch data).
- EPG data.

### 9.1.5 Tuner & IF (diagram A7 & B2)

The tuner UV1316 is $I^2C$-controlled and is capable of receiving off-air, S- (cable) and Hyperband channels:

| | |
|---|---|
| • Low | 44 - 156 MHz |
| • Mid | 156 - 441 MHz |
| • High | 141 - 865 MHz |

The tuning is done via $I^2C$. The reference voltage on pin 9 is 33 V. This voltage is derived from the 180 V (from the LOT) via a resistor of 120 kΩ and a zenerdiode. The OTC together with the HIP control the tuning procedure. There is also automatic switching for the different video systems.

The IF-filter is integrated in a SAW (Surface Acoustic Wave) filter. The type of this filter is depending of the standard(s) that has to be received. Two SAW filters are used: One for filtering picture-IF and the second-one for sound-IF. An extra filter (5403), tuned at 40.4 MHz, is necessary for L/L' sets with 6.5 MHz sound to suppress the neighbour channel.

The output of the tuner is controlled via an IF-amplifier with AGC-control. This is a voltage feedback from pin 62 of the HIP to pin 1 of the tuner. AGC take-over point is adjusted via the service alignment mode 'Tuner AGC'. If there is too much noise in the picture, then it could be that the AGC setting is wrong. The AGC-setting could also be mis-aligned if the picture deforms with perfect signal. The IF-amplifier amplifies too much.

The video IF-signal is fed to pins 2/3 of the PLL-controlled IF-demodulator. The voltage controlled oscillator of the PLL is adjusted via the service menu 'IF AFC'. If the alignment is correct then the displayed frequency in the installation menu is the same as the applied frequency from a generator. The external coil L5408 connected between pins 7/8 is used as reference. The demodulated IF-video signal is available at pin

10 of the HIP. In this video signal there is a rest of sound carrier, which is filtered by the sound trap 1407.
Then the signal is again fed to the HIP on pin 12 where the group delay can be corrected, dependent on the standard that is received. On pin 13 the CVBS-signal becomes available which is used for further processing in the television. Via TS7322 the signal is supplied to EXT1 and back into the HIP on pin 14 to the source/record selection.

To realise quasi split sound the IF-signal is fed to the HIP on pin 63/64 via SAW-filter 1405. The FM (or AM for L-norm) -modulated signal is available on pin 5 and is fed to the audio demodulator MSP34xx.

### 9.1.6 Video: High-end Input Processor (HIP, diagram B2))

In the EM2E the TDA932xH input processor is used, which contains the following functions:
- IF demodulation.
- Group delay correction.
- AFC signal generation, used to track drifting transmitters.
- Sound carrier re-generation (SIF).
- AM demodulation.
- Sync acquisition, delivering HA and VA.
- Switching off IF-filtering.

The HIP has various inputs.
- Full matrix switch with:
  - 2 CVBS inputs
  - 2 Y/C (or additional CVBS) inputs
  - 1 CVBS front end input
- Two RGB inputs and 2 status-inputs

Outputs: Three separate switchable outputs can be used:
- 1 YUV-output is fed to the PICNIC
- 2 CVBS outputs: One for Teletext Dual Screen and the other for output to EXT2 to have WYSIWYR (What you see is what you record)

I/O-switching: The external signals are fed directly to the I/O part of the HIP with status from pin 8 of SCART. On the HIP there are two status inputs available (pins 15, 17) with two voltage levels:

| | |
|---|---|
| 4:3 | -> 2.2 V |
| 16:9 | -> 5.5 V |

The input signals from the Front I/O are fed to the HIP and front detection is also fed to the OTC.
EXT1 is full SCART: thus CVBS and RGB. The RGB-selection is done in the HIP.
EXT2 is meant for VCR and has therefore some additional signals in relation to EXT1 but no RGB. EXT2 has also the possibility for Y/C_in and Easylink-Plus (P50). Y_in is with pin 20 and Chroma in with pin 15. Easylink is handled via pin 10 of the SCART and this is a bi-directional communication.

Easylink supports the next features:
- Signal quality and aspect ratio matching
- One touch play
- One touch text
- PIP
- Pre-set download
- WYSIWYR
- Automatic Standby

With Easylink-Plus is added:
- Country and language installation
- System Standby
- Intelligent set top box features
- NexTView download
- Timer record control
- VCR control feature

***Video processing***
The sandcastle-pulse of the HIP will not be used for synchronisation. The HOP will generate synchronisation signal derived from the feature box (PICNIC) signals. If a VCR is connected, there is also an automatic correction for Macrovision. This is active for the external sources and the pre-sets 0, 90-99.
The HIP itself (no external voltage) controls the Y/C switch in the HIP.
The chrominance decoder in the HIP is full multistandard: PAL/SECAM/NTSC.
Two different crystals can be connected to the pins 54 & 57 without any alignment. The crystals are also used as a reference for the synchronisation. A digital control circuit that is locked to the reference signal of the colour decoder determines the start-up of the sync. This crystal may only be replaced by the original one. If just a crystal is taken, the internal capacitance will be different and the effect will be that there is no colour.
In the HIP a sync separation has been integrated; the HIP delivers the HA and VA 50Hz/60Hz to the PICNIC. On pin 59 there is the 1fH sandcastle but this is not connected to any circuit and only used internally for the colour demodulator. The 2fH-sandcastle signal is generated by the HOP.

### 9.1.7 Video: Feature box (PICNIC, diagram B3))

***Introduction***
The basic function of the Feature box (FBX6) is picture improvement, and depending on the version, several scan conversion methods can be applied. The PICNIC (SAA4978H) is the central key component.
In the EM2E-chassis the featurebox is integrated on the SSB. The PICNIC is used for the 100Hz conversion. In the PICNIC the following functions are present:
- The ADC.
- The DAC.
- The 100 Hz conversion.
- The Panorama mode.
- The noise limiter (DNR).
- The contrast improvement.

All these functions are integrated in one IC: SAA4978H, 160 pins QFP

***ADC/DAC***
Analogue to Digital conversion is done with three identical 9-bit ADC's.
Digital to Analogue conversion uses three identical 10-bit DAC's.
In the PICNIC there are three 9 bits ADCs present for Y,U,V. For digitising the Y (luminance) 9 bits are used, to realise a more detailed picture. The 9 bits are only internally used. Via dithering the 9 bits are reduced to 8 bits and that data is stored into the memory. The data in the memory is fed back to the PICNIC and via undithering the data is again reproduced 9 bits for processing.
U/V (colour difference signals) is also sampled with 9 bits. These two 9 bit data streams are multiplexed to 4 bits data streams. This reduction can be allowed, as the perception for colours by the human eye is less sensitive as for luminance.

***100 Hz conversion***
The main task of the PICNIC is the conversion from 50Hz to 100Hz for YUV and HV-sync. In order to remove 'large area flicker' (especially visible in a white picture), the field-rate of the video is doubled by the FBX6. A 50/60 Hz frame frequency is converted to 100/120 Hz. Also the line frequency (16 kHz) is doubled (32 kHz). Basically, when the video input contains fields A, B etc..., the conversion provides an AABB sequence on the display. The actual conversion is done in the first Field Memory by reading it twice at double speed, while writing it once.

### *PROZONIC*

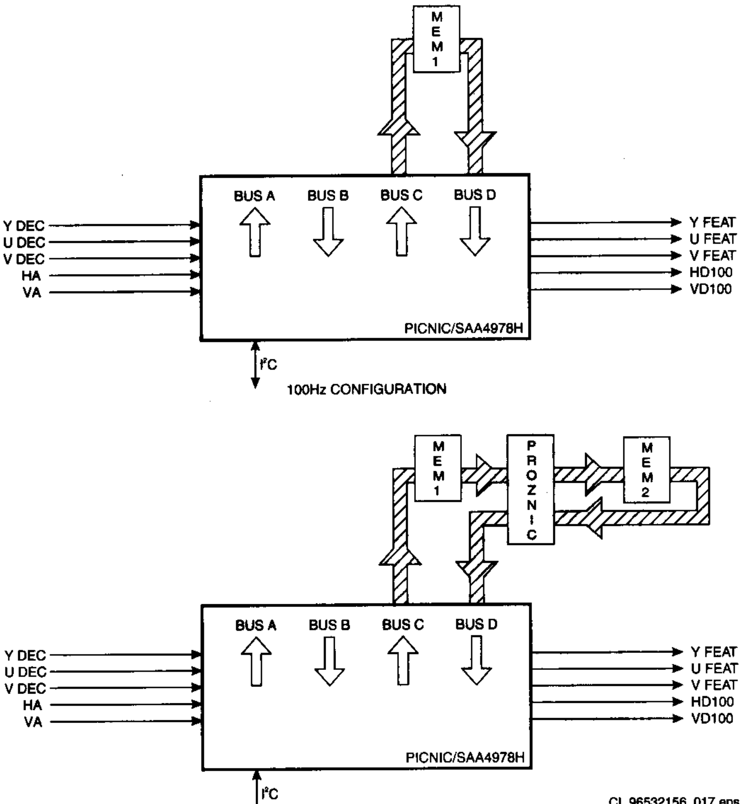

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**Figure 9-8**

To the PICNIC external IC's are connected dependent of the features.
If EM2E has only 100Hz then only one memory-IC is used to store one frame.
For sets with Digital Scan the PROZONIC (IC7708, SAA4990H) has been added with two memory-ICs (IC7714/7715). It is an abbreviation for PROgressive scan Zoom and Noise reduction IC.
When applying this, the 2nd Field Memory has to be installed.
The following functions are available:

- Line flicker reduction (Digital Scan): this is a feature to reduce the 25 Hz interlace line flicker.
- Dynamic Noise Reduction: noise affected signals can be improved by combining the pixel values of the current and past video fields. This is however only possible in areas without movement.
- Variable Vertical Sample Rate Conversion
- Synchronous No Parity Eight bit Reception an Transmission interface (SNERT-bus)

Depending on the chassis model, the FBX6 can have the following specification:

| Featurebox 6 diversity | |
|---|---|
| Set | Chipset |
| EMG 1fH | |
| EMG 2fH | 1 Memory |
| EMG 2fH DNR | 1 Memory incl. DNR |
| EMG 2fH Dig. Scan | PROZONIC + 2 Memories |

#### *Dual Screen compression*

The PICNIC can provide horizontal video compression up to 50 %. The compress mode can be used to display dual screens for instance with Teletext (only for widescreen sets).

#### *Panorama*

To fit 4:3 pictures into a 16:9 display, a panoramic horizontal distortion can be applied to make a screen-fitting picture without having black sidebars or lost video.

The centre horizontal gain is programmable and the side gain is automatically adapted to make a screen-fit.

#### *Automatic Aspect Ratio Adaptation (AARA)*

This feature uses data from the 'black bar detection circuit' to adapt the vertical and horizontal amplitude to an aspect ratio belonging to the display without showing the black bars.

#### *CTI*

At CVBS video signals, the bandwidth of colour signals is limited to 1/4 of the luminance bandwidth. Transients between areas of different colours are therefore not very sharp. The PICNIC can steepen these transients artificially with a time manipulation algorithm.

#### *Dynamic Contrast*

To make the contrast (black/white) range wider, Philips has invented Dynamic Contrast. It uses the digital memory used in 100 Hz sets. It measures every A-field (25x/s) and digitally analyses where on the greyscale most of the image is located. If it's a relatively dark image, the lighter part of that image is stretched towards white, so that more contrast will become visible in that picture. If it's a relatively light image, the darker part of that image is stretched towards black, so that these darker parts will have more contrast. When the image is in the middle of the greyscale, both dark and light parts are stretched.

### 9.1.8 Video: High-end Output Processor (HOP, diagram B4)

#### *General*

In the HOP (High-end Output Processor, TDA9330) the video processor and digital deflection processor are integrated. The main functions of the HOP are:

- Video control (contrast, brightness, saturation, etc.).
- 2nd RGB interface for OSD/TXT.
- Peak White Limiting.
- Cut-off control and White Drive (RGB outputs).
- Geometry control.

The YUV-signals from the PICNIC are fed to the HOP. In the HOP, the video and geometry control parts are integrated. Also the RGB-signals from TXT/OSD are inserted via the HOP. This IC has all functions from a video processor and geometry control (like the DDP in MD2). The geometry part delivers the H-drive, EW-drive and also a drive signal for rotation. The internal V-drive circuit of the HOP is not used (is explained further on).

#### *Video Control*

After conversion to RGB again, the signals can be controlled for Saturation, Contrast and Brightness.

#### *2nd RGB interface for OSD/TXT*

On pins 35 - 38 the RGB and fast blanking from the OTC (OSD and TXT) are inserted.

#### *Peak White Limiting*

On pin 43 there is a Peak White Limiting signal line (PWL). If the beam current (EHT-info line) increases, then the EHT-info voltage will decrease. PWL is controlled by average limiting via R3343/C2333.

#### *Cut-off control*

Switching the TV to Standby:

1. Vertical scan is completed.
2. Vertical flyback is completed (the horizontal output is gated with the flyback pulse, so that the horizontal output transistor cannot be switched on during the flyback pulse).
3. Slow stop of the horizontal output is started, by gradually reducing the 'on' time at the horizontal output from nominal to zero (this will take 50 ms).

4. At the same time the fixed beam current is forced via the black current loop for 25 ms. This is done by setting the RGB outputs to a maximum voltage of 5.6V.

In the EM2E a 'one-point' cut-off control is used:
A current of 8 µA (for cut-off) is fed to pin 44 of the HOP. This is done with a measurement pulse during the frame flyback. During the 1st frame, 3 pulses are generated to adjust the cut-off voltage at a current of 8 µA.With this measurement the black level at the RGB-outputs is adjusted. So at start-up there is no monitor pulse anymore. At start-up, the HOP measures the pulses which come back via pin 44. The RGB-outputs have to be between 1.5 V and 3.5 V. If one of the outputs is higher than 3.5 V or one of them lower then 1.5 V, the RGB-outputs will be blanked.

***Geometry control***
All geometry control is done via I$^2$C and the data is stored in the NVM (IC7011) of the SSB.

***Line drive (LINEDRIVE1).***
Line drive is derived from an internal VCO of 13.75 MHz. As a reference an external resonator is used (1301). The internal VCO is locked with the HD100-pulse, which comes from the PICNIC. The 'PHI-2' part in the HOP receives the HFB_X-RAY_PROT (pin 13) to correct the phase of the line drive. The EHT-info is supplied to pin 14 (DYN-PHASE-CORR) to compensate picture breathing depending on the beam current. Service tip: This is not used at the moment, therefore EHT-compensation in the service menu is put to zero.

***Frame drive (FRAMEDRIVE+).***
The VD100 signal from the PICNIC will be extended for 16.5 lines by the circuit around TS7309 and 7311. The resulting signal (VDHOP) will drive TS7310. This will result in the (asymmetric) FRAMEDRIVE+ signal.
Note: The Frame outputs (pins 1/2) of the HOP are not used!

***East/West drive.***
At pin 3 the E/W-drive is available. Pin 4 is a feedback input for the EHT-info and is used to prevent pumping of the picture. EHT varies also dependent of the beam current. For widescreen without load this is 31.5 kV and with load (1.5 mA) 29.5 kV.

***Frame rotation (only for 16:9 sets):***
For frame rotation a control voltage is used from pin 25 of the HOP. This voltage can vary from 0.4 V till 4 V.

***Guarding protections:***
- Flash detection:

When a flash occurs, the EHT-info will become negative very fast. Via D6303/D6304/R3316, TS7303 starts to conduct. This makes pin 5 of HOP high. When pin 5 of HOP is high, then the output (pin 8) is immediately stopped. If H-drive stops then also pin 5 will be low again, which will reset the flash detection. A bit (FLS) will be set in an output status register, so via the OTC it can be seen when there was a flash. This FLS-bit will be reset when the OTC has read that register.

- HFB protection:

If the HFB is not present then this detected via the HOP. The OTC puts the TV into protection and reads a register in the HOP. An error code will be generated.

### 9.1.9 Synchronisation (diagram B3 & B4)

The HIP video processor provides vertical and horizontal sync pulses VA and HA that are synchronised with the incoming CVBS signal. These pulses are fed to the PICNIC where they are doubled to be synchronous with the 100 Hz picture. The outgoing pulses, VD100 and HD100 are fed to the HOP that supplies the vertical and horizontal drive pulses and the 100 Hz (2fH) sandcastle pulse.

The VD100 pulse from the PICNIC is only one line long. Therefore this pulse is converted into a VDHOP signal by a 530 µs monostable oscillator (extended by 16.5 lines). This signal is on block function level equal to VSYNC and FRAMEDRIVE+.

The OTC is synchronised on the HD100 pulse from the FBX and on the VSYNC for the synchronisation of TXT/OSD/EPG

When no CVBS is offered to the video processor, the VA and HA pulses are switched off by the HIP, and the VD and HD pulses are then generated by the PICNIC. This to assure a stable OSD.

### 9.1.10 Horizontal (line) deflection (diagram A3)

*Driving the line output stage*

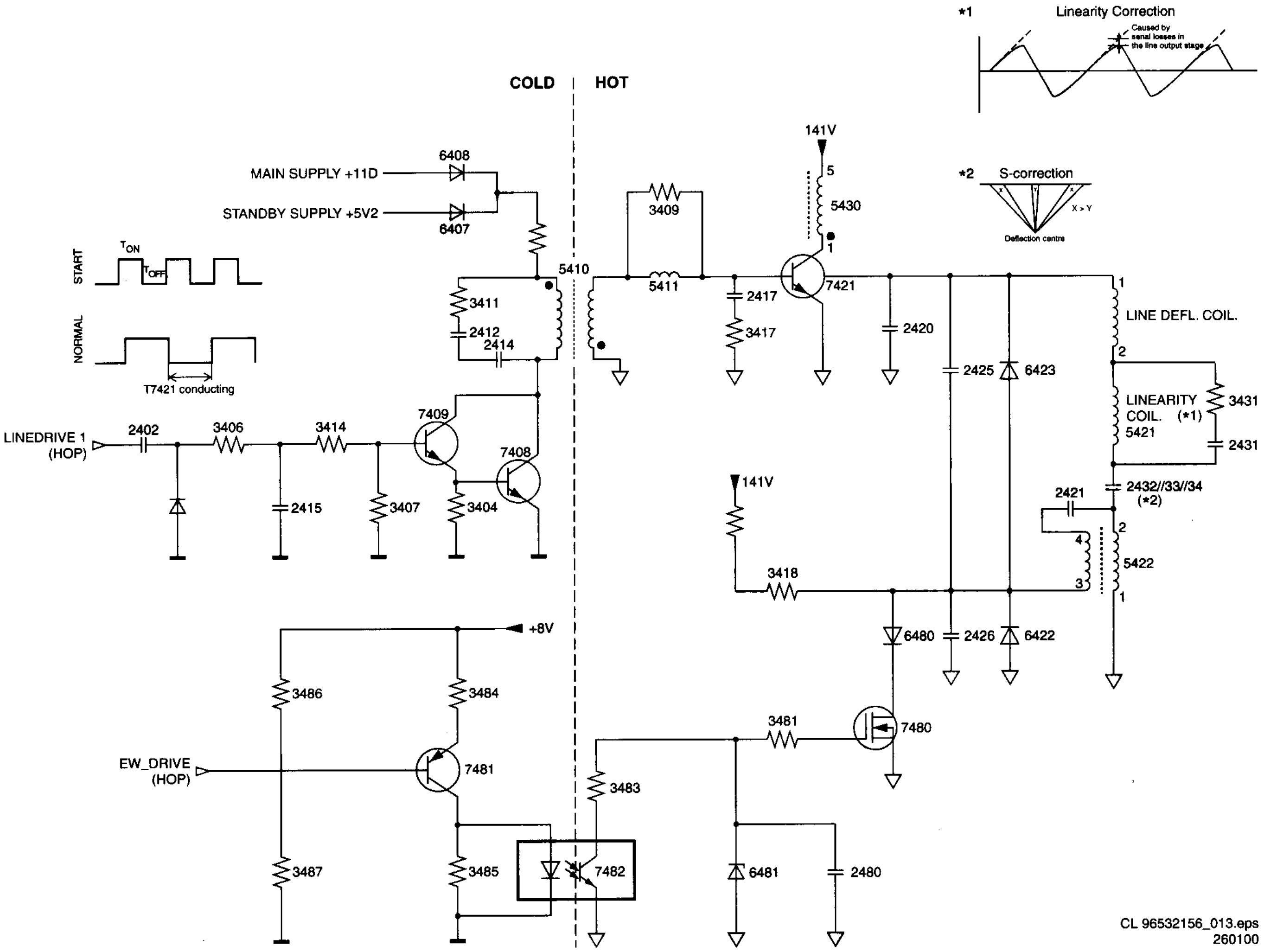

*1 Linearity Correction
Caused by serial losses in the line output stage
*2 S-correction
X > Y
Deflection centre
COLD
HOT
141V
MAIN SUPPLY +11D
STANDBY SUPPLY +5V2
6408
6407
3409
5430
5
1
5410
5411
7421
2417
3417
2420
3411
2412
2414
START
NORMAL
TON
TOFF
T7421 conducting
LINEDRIVE 1 (HOP)
2402
3406
3414
7409
7408
2415
3407
3404
LINE DEFL. COIL.
2
2425
6423
LINEARITY COIL. (*1) 5421
3431
2431
2421
2432//33//34 (*2)
4
3
5422
141V
3418
+8V
6480
2426
6422
3486
3484
3481
7480
EW_DRIVE (HOP)
7481
3483
3487
3485
7482
6481
2480
CL 96532156_013.eps
260100

Figure 9-9

The HOP (located on the SSB) generates the line-drive pulses (LINEDRIVE1), which have a frequency of 31250 Hz (T = 32 µs).

When the LINEDRIVE1 signal is high, TS7409 and TS7408 will conduct. A constant DC voltage will be applied across L5410, causing a linear increasing current through this coil. The secondary voltage of L5410 has a negative polarity so that TS7421 will block. When switching on the set, the current through L5410 is supplied by the 5V2 Standby supply (via D6407), and taken over by the +11D voltage (via D6408) of the main supply.

When the LINEDRIVE1 signal becomes low, TS7409 and TS7408 will block. The voltage polarity across the primary winding of L5410 will invert. The positive voltage on the secondary winding will now drive TS7421 into conductivity. Because of the storage time of the line transistor (TS7421), L5410 cannot transfer its energy immediately to the secondary side. This may result in high voltage peaks on the collector of TS7409 and TS7408. To prevent that these peaks will damage the transistors, a 'snubber' circuit (C2414, C2412 and R3411) will suppress them.

When the LINEDRIVE1 signal is high again, the above-described sequence starts again. Circuit L5411 and R3409 will increase the switch-off time of the line transistor.

The line stage will be started via the 'slow start' principle. During start-up, the HOP generates line drive pulses with a small $T_{ON}$ and a high frequency (50 kHz); $T_{OFF}$ will be constant and $T_{ON}$ will be gradually increased until the duty-cycle is 50 % (normal condition). The time interval from start to normal condition takes about 150 ms. When switching off, the same procedure is followed, but now in reverse order.

***Operation of the line output stage***

To explain the operation of the line output stage, we use the following start conditions:

- C2433 is charged to max. 141 V ($V_{BAT}$)
- TS7421 is driven into conductivity.

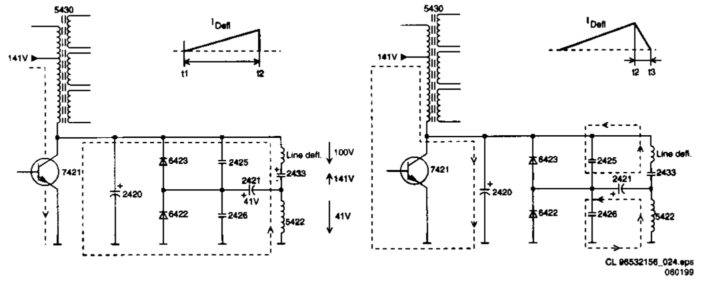
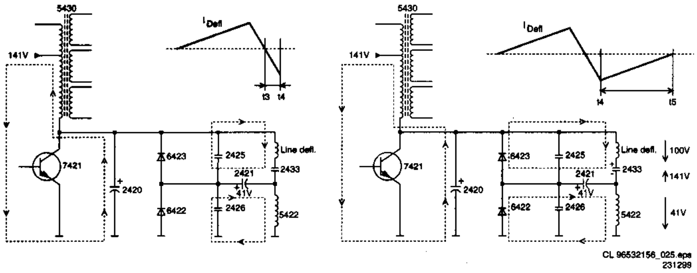

5430
141V
$I_{Defl}$
t1
t2
t3
7421
2420
6423
2425
2421
41V
2433
6422
2426
5422
Line defl.
100V
141V
41V
CL 96532156_024.eps
060199

Figure 9-10

Period t1 - t2:
When TS7421 is driven into conductivity, the capacitor voltage of 141 V, will be divided across bridgecoil L5422 and the deflection coil (conn. 0317). Due to the chosen inductance values, there will be 100 V across the deflection coil and 41 V across L5422. The linear increasing current in the deflection coil will result in a spot moving from the centre of the picture tube to the right.
The voltage across L5422 will also charge C2421 (41 V - 0.7 V).

Period t2 - t3:
At the moment the LINEDRIVE signal becomes high, TS7421 will stop conducting. In the coils a voltage will be induced, trying to maintain the current. The current through the line deflection coils continues to flow through C2425 and C2421 and the current through L5422 continues to flow through C2426 and C2421. The energy stored in the line deflection coil is passed to C2425, and the energy of L5422 to C2426.
The resonance-frequencies of these 2 LC-circuits define the flyback time of the spot from the right side of the picture tube to the left.
On average no current flows through C2421 and thus the voltage across this capacitor remains constant.



CL 96532156_025.eps
231299

Figure 9-11

Period t3 - t4:
As for the period t2 - t3; but now the current flows in the opposite direction, since the voltage across C2425 and C2426 is higher than the voltage across C2433 and C2421.

Period t4 - t5:
The coils want to maintain the negative current and will charge the capacitors negative. Because of this, D6422 and D6423 will conduct. The voltage is 100 V across the deflection coil and 41 V across L5422. As both diodes conduct, we may consider the voltage to be constant. A linear current flows with the same changing characteristics as in period t1 - t2. The spot now moves from the extreme left of the picture tube to the centre. Before the current becomes zero, and the spot is located in the centre of the frame, TS7421 reverts back into conductivity. First a short negative current will flow. The cycle starts again.

### *The linearity correction*

A constant voltage across the horizontal deflection coil should result in a linear increasing saw-tooth current. This however is not the case as the resistance of the coil is not negligible. In order to compensate for this, a pre-magnetised coil L5421 in series with the deflection coil is used. This coil ensures that during time interval t1 - t3 the circuit-resistance will be higher than during t4 - t5. L5421 is called the linearity coil.
To avoid self-oscillation, R3431 and C2431 are placed parallel to L5421.

### *The S-correction*

Since the sides of the picture are further away from the point of deflection than the centre, a linear saw-tooth current would result in a non-linear image (the centre would be scanned slower than the sides). To solve this, the deflection current for the right- and left side will be reduced.
C2433 is charged quadratic during time interval t1 - t2. Left and right the voltage across the deflection coil decreases, causing the deflection to slow down. In the centre, the voltage increases and the deflection will be faster. An S-shaped current will have to be superimposed onto the saw-tooth current. This correction is called finger-length correction or S-correction. C2433 is relatively small, as a result of which the saw-tooth current will generate a parabolic voltage with negative voltage peaks.. The current also results in a parabolic voltage across C2421, resulting in the finger-length correction, proportionally increasing with the picture width. The EW-DRIVE signal will ensure the largest picture width in the centre of the frame. Here the largest correction is applied. The larger the picture width, the higher the deflection current through C2433.

### *The E/W-correction*

A line, written at the upper- or lower side of the screen, will be larger at the screen centre when a fixed deflection current is used. Therefore the amplitude of the deflection current must be increased when the spot approaches the screen centre. This is called East/West correction.
The EW-DRIVE signal is generated in the HOP and will drive FET TS7480 via TS7481 and optocoupler TS7482. TS7480 will charge capacitor C2423 more or less, increasing the deflection current when reaching the centre of the screen.

### *Secondary line-voltages*

During the blocking time of TS7421, the magnetic energy of coil 1 - 5 of the LOT will be transferred to electrical energy in the secondary winding. Via rectifying and smoothing, the several secondary supply voltages will be generated:

- EHT, Focus and Vg2-voltage
- +180V for the CRT panel (pin 8 LOT)
- +11D for the line deflection (pin 12 LOT)
- +13VLOT for the frame deflection (pin 6 LOT)
- -15VLOT for the frame deflection (pin 3 LOT)
- Filament voltage (pin 9 LOT)

The EHT-INFO signal is derived via R3450//R3451. This signal decreases while the beam current increases. It is fed to the HOP to compensate for loss of picture width and picture height.

The DYN-FASE-CORR signal is fed to the HOP via C2455 and drives a dynamic phase correction necessary because of beam current variations. This is done by regulating $T_{ON}$ of the line transistor TS7421.

### *East-West circuit*

The moment TS7480 is driven into saturation, C2421 will discharge during the flyback. As a consequence of which C2421 must be charged again during the scan via the conduction diode D6422 (as long as C2421 is not charged to the voltage across L5422, D6422 will conduct). The current in the deflection coil is therefore larger than the current flowing in L5422 (1-2). The voltage across the deflection coil increases, so the picture width increases. When TS7480 blocks, C2421 will not discharge anymore and the voltage across C2421 will remain constant. The result is that the voltage across the deflection coil is minimal. The voltage across coil L5422, however, is maximal. This coil (L5422) consists of a transformer:

- As the current through the coil 1-2 increases (smaller picture width), the current through coil 3-4 decreases. Because of the transformer characteristic a higher voltage will be subjected to coil 3-4, which will counteract the current. The current will diminish even further.
- When the current through coil 1-2 diminishes (larger picture width), the current through coil 3-4 increases.

### *The EW Drive*

The EW drive signal originates in the HOP and is supplied to TS7480. The shape of this signal determines the various geometric correction parameters:

- H amplitude
- EW-parabola
- EW-corner
- EW-trapezium
- Horizontal parallelogram
- Horizontal bow

### *Beam current correction*

The EHT-info at point 10 of the LOT is dependent on the value of the beam current and the voltage divider R3450, R3451 and C2450. The EHT-info is fed to the HOP to trim the contrast and to compensate for the changes in picture-width as a function of the EHT-info, when the high-voltage is decreased. The EHT-info is integrated via C2450 and sent to the gate of the E/W FET (TS7480) as a DC-voltage to correct the EW-current.

## 9.1.11 Vertical (frame) deflection (diagram A4)

### *Driving the frame output stage*

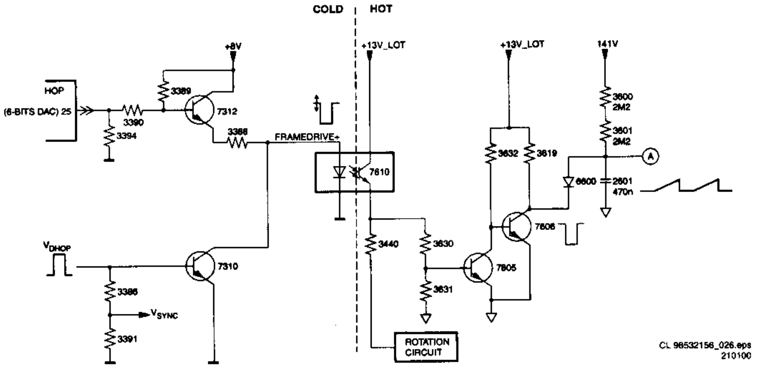


**Figure 9-12**

The HOP drives the frame output stage. As the HOP is 'cold' and the frame output stage is 'hot', they must be galvanic isolated by means of an optocoupler. In the MG-chassis the HOP generates 3 signals needed for the frame output stage: VDPOS, VDNEG and FRAME ROTATION. To avoid the costs of 3 optocouplers, the frame drive pulse and rotation DC-voltage are added together and then fed to optocoupler TS7610.

This is done as follows: The VD100 signal from the PICNIC (diagram B3 pin 19) is extended for 16.5 lines and inverted via a monostable multivibrator (TS7311 & TS7309, diagram B4). The output signal VDHOP is then superimposed on a DC-voltage from pin 25 of the HOP. The resulting signal is called FRAMEDRIVE+ and is fed to optocoupler 7610 (diagram A4). So this signal contains info for both the frame deflection and the frame rotation.

The circuit around IC7440 will amplify this signal and the output current will flow through the rotation coil. The vertical pulses on this signal are filtered by C2445 to ensure that only a DC-voltage will be supplied to the rotation coil.
The output voltage of the rotation circuit is between -8 and +8 V.

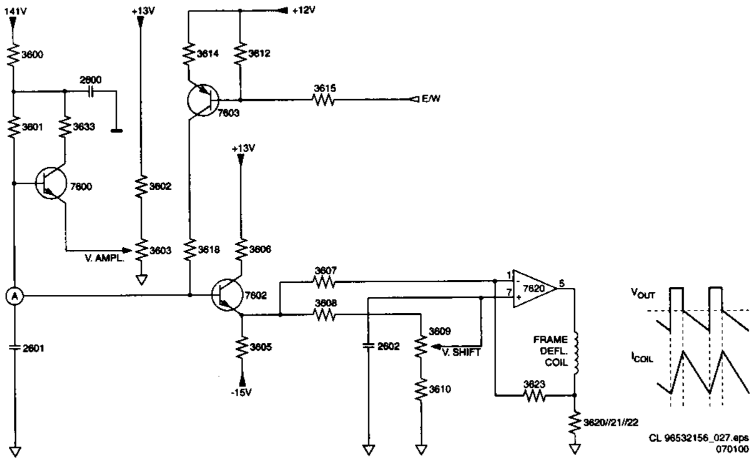


**Figure 9-13**

The sawtooth voltage for the frame output stage is not generated by the HOP but by a discrete circuit after the optocoupler 7610: via R3600 and R3601 a linear increasing voltage over C2601 is built up with a large time constant.

The circuit around TS7603 is a current source, driving C2601 with a current value derived from the E/W modulator. This will result in an S-shaped voltage on C2601 (also known as EW-correction).

### *Flyback generator*

The frame output stage is supplied via the +13 V and -15 V coming from the LOT. The output of the amplifier is 0 $V_{DC}$, so a coupling capacitor is not required.

During the (forward) scan, a supply of +13 and -15 V is sufficient to respond to the slow changing current. The flyback generator puts a voltage of -15 V on pin 3. Because of the voltage drop over zenerdiode D6622 (8.2 V), C2622 will be charged to 19 V: being 13 + (15 - 8.2 - 0.7) V.
During the flyback scan, the change in current per time is much larger, so a higher voltage is required. The flyback generator will now generate a voltage of +13 V on pin 3. Added to the charge on C2622 this will give a flyback voltage of 32 V (depending on the CRT size, this value can differ).

The IC amplifier (IC7620, pin 5) supplies the sawtooth current to the frame deflection coil. The current through this coil is measured via R3620//R3621//R3622 and fed back to the inverting input of the amplifier.
R3624 and C2624 on the output of the amplifier, form a filter for high frequencies and in that way also prevents oscillations. Peak voltages on the output, e.g. as a result of a possible flash, are damped by the clamp circuit consisting of D6619, C2627 and R3627. The network consisting of R3625, R3629 and C2629 form an extra damping circuit.

### *Protection circuit for bridge-coil and frame output stage*

The secondary voltage of bridge coil L5422 is guarded at the diode modulator (D6421/22) via a detection circuit consisting of an 8.2 V zenerdiode (diagram A3). When the bridge-coil is working properly, the average voltage on D6422 is such that this zenerdiode will conduct and will drive TS7652 into saturation via the BRIDGE_PROT signal (see diagram A4). When, for any reason, the secondary side of the bridge-coil is shorted, the average voltage on D6422 will drop below the zener-voltage and TS7652 will block. Now capacitor C2642 will be charged. Transistor TS7407 will start conducting and the STANDBY signal will be grounded via R3403. This will switch off the main supply (see diagram A1).

Via the circuit built around TS7641 the frame output stage is guarded. If the frame output stage is working properly, TS7641 and TS7652 will both conduct and thereby discharging C2642. TS7407 is blocked now, causing the STANDBY signal to be high-ohmic.
If there are frame pulses missing, TS7641 will block and capacitor C2642 can be charged. Transistor TS7407 will now start conducting and the STANDBY signal will be grounded via R3403. This will switch off the main supply (see diagram A1).

### 9.1.12 Audio (diagram B6, A5 & A6)

***Introduction***
All EM2E sets contain one of ITT's Multistandard Sound Processing IC's for sound decoding. The diversity arises because each member of the MSP-family handles its own set of sound standards:

| | |
|---|---|
| MSP3415D: | Europe & AP decoding, Stereo incl. NICAM. |
| MSP3451G: | Global decoding, Virtual Dolby. |

This IC takes care of the main FM sound decoding. AM decoding for the L system is done by the HIP. The demodulated L sound is then again source selected and processed in the MSP. The reason for this is the bad AM detection performance of the MSP. In case of NICAM L however, this is handled by the MSP.

All MSP versions contain digital audio processing, used for the basic left/right stereo sound, such as bass, treble, balance, incredible sound and spatial. In addition to that, the MSP3451 is also able to perform Virtual Dolby, a Dolby approved sound mode for surround sound reproduction with left/right speakers only.

***Audio source selection***

- MSP3515D (stereo)

This IC is an economised version of the MSP3410 that is used in the MG-chassis. It can cover 2 stereo and 1 mono (AM) input. Since more inputs are required, a separate source selector is used (HEF4052, IC7675). This selector has EXT1, EXT2, FRONT and SC1-OUT (Tuner) as input and is connected to the SCART1 input of the MSP3415. The SCART2 input is not used.

Since the MSP3415 has only one SCART output, which is connected to the SCART1, a constant level output and connection to SCART2 is not available. This is fixed by connecting the HEF4052 input selector to the constant level output and to SCART2 via a so-called 'Régimbeau' switch (IC7652).
This switch is needed to prevent feedback (Larsen effect). When EXT2 is chosen as input signal, and the output of SCART2 is selected, this means that the main picture is also EXT2 and will cause the Larsen effect. To prevent this, the record select must be switched to Tuner. This is especially important when decoders are used, behind a 'transparent' VCR connected to EXT2.

To get a constant level output if the Tuner is selected, the SCART1 output (Tuner at any time), has to be fed back to the input selector and selected as input for the MSP (SCART1 input).

The MSP3415 has no separate output to drive a headphone. The headphone is therefore hardwired (on the LSP) to the main sound output.

- MSP3451G (Virtual Dolby)

The MSP3451, which is used in all versions supporting Virtual Dolby, is capable of supporting 4 stereo inputs and 1 mono (AM) INPUT. Therefore the extra input selector (HEF4052) is not needed.

The MSP3451 is also capable of supporting 2 SCART outputs, so the trick used in the MSP3415 set-up to get a constant level output is not needed.

The MSP3451 has a separate headphone output, so sound control be done separate from the speakers.

***Audio decoding***
At the input a choice can be made between two IF-signals; SIF and SIFM.
The selected signal is fed to the AGC. After this, an ADC converts the IF-signal to digital.

This digital signal can be processed by 2 demodulation channels. The first one is able to handle FM and NICAM signals. The second one can handle FM and AM signals.

Each channel contains a mixer to shift the incoming signal in the frequency domain. This shift is determined by the value of a DCO.

After the down-mix, the signal is fed, via a filter, to a discriminator. From here the AM, FM or NICAM demodulation can be performed.

Both channels contain an 'automatic carrier mute' function, which automatically mutes the output of the analogue section when no carrier is detected.

After demodulation, the FM-signals are subjected to a de-emphasis operation. After that the matrix of the stereo system is applied.

***Audio processing***
The sound processing in EM2E is completely done by the MSP3415D for 'Stereo' sets or the MSP3451G for 'Virtual Dolby' sets:

- Volume control is done by the user via the SOUND menu.
- Tone control in 'Stereo' sets is done via the BASS/TREBLE control, in 'Virtual Dolby' sets via the 5-band equaliser.
- Headphone control in 'Stereo'-sets is done via the loudspeaker output of the MSP, no sound control possible. In 'Virtual Dolby'-sets, the MSP has a separate Headphone output so separate sound control is possible.
- Mute control can be done in different ways:
  - Via the SOUND_ENABLE line of the OTC. Used during start-up/switch-off conditions, in order to avoid audible plops.
  - Via the decoding part of the MSP.
  - Via the processing part of the MSP.

The mute on the RC or in the UI is per today a combination of processing mute and SOUND_ENABLE line. When a user mute is done, the processing mute will turn down the volume, after which the SOUND_ENABLE line is switched. De-muting is the other way around. The reasons for this is a technical problem with crosstalk of the headphone into the loudspeakers.

***Automatic Volume Levelling (AVL)***
One of the features of the MSP-family is AVL. If used, it limits the big volume differences in the broadcast between e.g. news transmissions and commercials or within a movie.
To be able to get a Dolby approval (for the Virtual Dolby sets), the AVL feature must be switchable. Therefore, the AVL feature is customer switchable via the menu.

***Audio amplification***
The audio amplifier part is very straight forward. It uses an integrated power amplifier IC, the TDA2616. It delivers an

output of 2 x 10 WRMS to 2 full range speakers. A subwoofer is not implemented.

The supply voltage is +28 V, generated by the main supply via L5506.

Muting is done via the SOUND-ENABLE line connected to pin 2 of the amplifier-IC and coming from the OTC. This signal is inverted by TS7730, as a result of which at a high level of the SOUND-ENABLE signal, current is sinked from pin 2 and the IC mutes.

### 9.1.13 Teletext / NexTView (diagram B5)

***Teletext***
The TXT-decoder in the OTC gets its video signal directly on pin 5 (from the HIP).
The RGB-outputs are available on pins 77/78/79. Fast blanking is realised via pen 80.
In the previous chassis there was separate memory to store the TXT information. In EM2E the DRAM (IC7007) of the microprocessor is also used for the TXT-decoder.

***NexTView***
NexTView allows the user to display a program guide on the TV screen that contains extensive information for each program.

This information can be displayed in a number of different summaries:

- DAY: The daily summary shows, from the current moment, the program schedule for several stations for a short time ahead.
- CHANNEL: The channel summary shows the program schedule for one station.
- THEME: The theme summary shows, for each theme, the program schedule of the various stations. These themes consist of sport, film, culture, etc. and is determined from the station side.

NexTView does not have to restrict itself to information about the station that is being viewed, but also offers information about other stations. In the various summaries 3 different commands can be given for the various program overviews. These commands appear as follows:

- WATCH: The set immediately switches over to the station concerned.
- REMINDER: The start time and date and the station of the program concerned is stored in the TV reminder list. The TV will give an OSD-message with the program information, or switch on the set at the correct moment (provided the set is in Standby) and tune to the station concerned.
- RECORD: The timer of the video recorder with ‘Easylink Plus’ is programmed with the data of the program concerned. There has to be a video recorder (with Easylink Plus) connected to SCART2 otherwise the ‘RECORD’ function will not be highlighted. The connection is via pin 10 from SCART. This means that it has to be a full SCART or at least pin 10 has to be wired.

In order to be able to realise NexTView, two teletext type data flows, Data stream 1 and 2, are transmitted with various sub-code pages of information. This data flow can transport limited information (max. 40 pages). Data stream 1 is quick repeating with a repetition time of approximately 20 to 30 seconds. However, Data stream 2 has a much longer repetition time of approximately half an hour and has a large transport capacity.

- Data stream 1 contains information of the station that is being viewed.
- Data stream 2 contains up to one week of advance information from various stations that are covered by the provider.

### 9.1.14 CRT / SCAVEM / Rotation (diagram F)

***RGB amplifiers***
On the CRT panel, the RGB amplifier (TDA6108, IC7307) is located. Via the outputs 9, 8 and 7 the cathodes of the picture tube are driven.
The supply voltage for the amplifier is 180 V and is derived from the LOT.

***SCAVEM***
The SCAVEM-circuitry is implemented in the layout of the picture tube panel. It is thus not an extra module. SCAVEM means SCAn VElocity Modulation. This means that the horizontal deflection is influenced by the picture content. In an ideal square wave, the sides are limited in slope by a limited bandwidth (5 MHz).
SCAVEM will improve the slope as follows: At a positive slope, a SCAVEM-current is generated which supports the deflection current. The first half of the slope the spot is accelerated and the picture is darker, while at the second half of the slope, the spot is delayed and the slope becomes steeper.
At the end of the slope, the SCAVEM-current decays to zero and the spot is at the original position. An overshoot occurs which improves the impression of sharpness. At the negative slope, the SCAVEM-current counteracts the deflection.
During the first half of the slope, the spot is delayed, the slope becomes steeper.
During the second half the spot accelerates, the SCAVEM-current is zero at the end of the slope.

Via the three resistors R33315, R33317 and R3320, Red, Green and Blue are added together and offered to the emitter TS7300. On the collector of this transistor, configured in a common base, the sum of these 3 signals is obtained. Via the emitter follower formed with TS7301, this signal is conveyed to the differentiator C2303, R3309 and R3318. Only the high frequencies are differentiated (small RC-time).
The positive and negative pulses of this signal drive respectively TS7303 and TS7302 into conductivity. The DC setting of the output stage is set by R3304, R3308, R3316 and R3319. The working voltage of the transistors is settled at half the supply voltage.
At the positive section of the pulse, the current flows through R3318, C2307, the SCAVEM-coil and TS7303. At the negative section of the pulse, the current flows through R3318, C2409, the SCAVEM-coil and TS7302.

***Rotation***
In sets with a rotation coil (widescreen sets ≥ 32"), the amount of frame rotation is adjusted with the DAC-output of the HOP (see also 'Vertical Deflection').

### 9.1.15 Software related features

Following features are described:

- Smart Local Doming Prevention (SLDP)
- Auto TV
- Switch ON behaviour

***Smart Local Doming Prevention (SLDP)***
A CRT with an iron shadow mask shows a considerable amount of local doming (due to local heating), resulting in unwanted colour artefacts.
SLDP helps to reduce these artefacts for both 16:9 and 4:3 sets to an acceptable level. It measures the beam current in areas that are sensitive to local doming and reduces the contrast if the beam current in these places exceeds a pre-set threshold.
The chosen solution in EM2E, is based on the PICNIC hardware and software and it uses the histogram measurement of the PICNIC to make a prediction of the local heating of the CRT shadow mask.

With SLDP, local doming is diminished to an acceptable level at the cost of contrast reduction. By using a 'smart' solution for a part of the necessary contrast reduction, the resulting picture remains even more acceptable.
SLDP is not a feature. It's an algorithm that diminishes local doming effects. These effects occur whenever iron mask ( and in a limited way invar mask) tubes are applied. Therefore, there is no reason to make it switchable for the customer. However, SLDP can be switched off via the Service Alignment Mode (SAM).

### *AutoTV*

The AutoTV (or 'Automatic Picture Control' or 'Active Control') aims at giving the customer the best possible picture performance at any time. Therefor it does real time processing of the video signal and as a result, it decides to adapt several video parameters throughout the whole chassis.

The AutoTV feature integrates traditional picture performance, AutoTV functionality and 'smart controls' in order to come to a kind of 'supersmart' TV. It can be subdivided in:

- Auto Noise Reduction. This algorithm measures the amount of noise in the incoming video signal (this is done by the LIMERIC part of the PICNIC). As a result of this measurement, the amount of noise in the picture is corrected, starting from that noise level which is annoying for the customer. Which parameters exactly can be used is depending on the hardware.
- Auto Sharpness. This algorithm measures the amount of sharpness via the bandwidth of the incoming video signal and adapts the peaking frequency in the PICNIC according to this info. If the 'sharpness meter' sees the video content as 'sharp', high frequency peaking will be used. On the other hand, if the picture content is seen as 'not sharp', a low/mid frequency peaking is used. There is a coupling between the Auto Noise and the Auto Sharpness algorithm: if noise is present in the video content, then in general the sharpness will be made less aggressive. Special care has to be taken to the interaction of the LIMERIC and the vertical peaking of the PICNIC: a too big amount of vertical peaking increases the visibility of the 2DNR artefacts.

In the EM2E a limited AutoTV control function is used: only a combination of above described features is used in the background in order to improve the set performance, specially focussed on noise reduction.

### *Switch ON behaviour*

First of all, the microprocessor needs to start up: After the power is applied, the 'Standby supply' starts oscillating, generating the +5V2 and +3V3. When ready, a reset (POR) is generated and the OTC is awakened.

During reset, the OTC puts a high level on all his outputs, causing the degaussing relay to close. After the reset, the outputs and inputs of the OTC must be initialised to their default state. The degaussing output of the OTC must stay high for 12 seconds.

Next step is the check whether the set needs to be in Standby or not. Therefore, the NVM content is read and the Standby-bit is checked. If the set is to stay in Standby, there is no further action.

If the set has to be switched 'on', the Standby-info line is pulled low. This results in the low power mode start-up of the HOP. The line drive starts to run on 50 kHz, wakes up the main supply and the +5 V, +8 V and +141 V supplies become available. The OTC waits until the +8 V is fully present. This is done by checking the ADC input of the OTC. A positive result means three times a positive +8 V detection in a row (time between each polling approx. 5 ms). If this detection still fails after 1 second, an error should be generated and the set must be switched to protection (error: "+8 V).

After detection of the +8 V, the MSP must be reset, since it can disturb $I^2C$ traffic when not properly reset. From this moment on, $I^2C$ traffic is possible.

To be sure that the HOP is properly started up, the POR bit of the HOP should be read. If this is not successful, the Standby info has to be put high again and an error code (code 11: HOP) will be generated. If the reading of the POR bit is successful, the starting procedure can be continued.

The Standby info line must be switched high again. The sync mode and the black current stabilisation loop of the HOP must be disabled in order to have a smooth start-up. Within 23.5 ms after reading the HOP POR bit, the HOP has to be started up via the HOP_start commando. If this condition is not fulfilled, the HOP will stop his line drive again and the set will not be able to start up.

During start-up of the deflection, $I^2C$ traffic must be disabled for 250 ms to avoid data corruption. If flashes or spikes are generated during EHT start-up, $I^2C$ data could be disturbed or corrupted.

After deflection is powered up completely, all protection algorithms are set active.
The rest of the NVM content can now be read and the IC's can be initialised according this info.

If SLDP is present in the set, an initialisation of SLDP has to be performed, including a calibration of the beamcurrent ADC.

The sync-mode of the HOP must be switched to active and the black current stabilisation loop in the HOP is switched on. Some extra checking is done to ensure that the loops are completely stabilised. Software sets all the necessary parameters for a correct sound and image and unblanks the picture.

A provision is foreseen to avoid sets in the field that will never unblank, if the picture tube is severely worn out. If the black current stabilisation does not become stable within a time frame of 30 seconds, the picture is unblanked anyway

## 9.2 Abbreviation list

| | |
|---|---|
| AARA | Automatic Aspect Ratio Adaptation: algorithm that adapts aspect ratio to remove horizontal black bars; keeping up the original aspect ratio |
| ACI | Automatic Channel Installation: algorithm that installs TV sets directly from cable network by means of a predefined TXT page |
| ADC | Analogue Digital Converter |
| AFC | Automatic Frequency Control: control signal used to tune to the correct frequency |
| AGC | Automatic Gain Control: algorithm that controls the video input of the featurebox |
| AI | Artificial Intelligence |
| AM | Amplitude Modulation |
| ANR | Automatic Noise Reduction: one of the algorithms of Auto TV |
| AR | Aspect Ratio: 4 by 3 or 16 by 9 |
| Artistic | see OTC 2.5: main processor |
| ASF | Auto Screen Fit: algorithm that adapts aspect ratio to remove horizontal black bars but without throwing away video information |
| ATV | See Auto TV |
| AUDIO_C | Audio Centre |
| AUDIO_L | Audio Left |
| AUDIO_R | Audio Right |
| AUDIO_SL | Audio Surround Left |
| AUDIO_SW | Audio Subwoofer |
| AUDIO-L-PROC | Audio left processed |
| AUDIO-R-PROC | Audio right processed |
| AUDIO-SR | Audio surround right |
| Auto TV | Name for the combination of picture features/improvements which work automatically (ANR / Auto sharpness/ Auto Histo/ambient light). |
| BC-PROT | Beam current protection |
| BG | System B and G |
| BLC-INFO | Black current information |
| B-SC1-IN | Blue SCART1 in |
| B-SC2-IN | Blue SCART2 in |
| B-TXT | Blue teletext |
| CENTER | Centre speaker |
| C-FRONT | Chrominance front input |
| CL | Constant Level: audio output to connect with an external amplifier |
| ComPair | Computer aided rePair |
| CRT | Cathode Ray Tube or picture tube |
| CSM | Customer Service Mode |
| CTI | Colour Transient Improvement: manipulates steepness of chroma transients |
| CVBS | Composite Video Blanking and Synchronisation |
| CVBS-SC1-IN | CVBS SCART1 in |
| CVBS-SC2 OUT | CVBS SCART2 out |
| CVBS-SC2-IN | CVBS SCART2 in |
| CVBS-SC3-IN | CVBS SCART3 in |
| CVBS-SC4-IN | CVBS SCART4 IN |
| CVBS-TER | CVBS terrestrial |
| CVBS-TXT-DS-OUT | CBVBS teletext Dual Screen out |
| CVBS-TXT-OUT | CVBS teletext out |
| CVBS-Y-FRONT | CVBS luminance front input |
| DAC-HOP | Digital analogue converter HOP IC |
| DBE | Dynamic Bass Enhancement: extra low frequency amplification |
| DC-filament | Filament supply voltage |
| DC-PROT | DC protection |
| DFU | Direction For Use: description for the end user |
| DNR | Digital Noise Reduction: noise reduction feature of the box |
| DSP | Digital Signal Processing |
| DST | Dealer Service Tool: special remote control designed for dealers to enter e.g. service mode |
| DVD | Digital Versatile Disc |
| DYN-FASE-COR | Dynamic phase correction |
| EHT | Extra High Tension |
| EHT-INFO | Extra High Tension information |
| ELDP | Electrical Local Doming Prevention (only HW) |
| EPG | Electronic Program Guide: system used by broadcasters to transmit TV guide information (= NexTView) |
| EW | East West, related to horizontal deflection of the set |
| EXT | External (source), entering the set via SCART or via cinches |
| FBL | Fast Blanking: DC signal accompanying RGB signals |
| FBL-SC1-IN | Fast blanking signal for SCART1 in |
| FBL-SC2-IN | Fast blanking signal for SCART2 in |
| FBL-TXT | Fast Blanking Teletext |
| FBX | Feature Box: part of small signal / separate module which contains 100 Hz processing, extra featuring and AutoTV algorithms |
| FEAT-U | U from Feature Box |
| FEAT-V | V from Feature Box |
| FEAT-Y | Y from Feature Box |
| FILAMENT | Filament of CRT |
| FLASH | Flash memory |
| FM | Field Memory or Frequency Modulation |
| FMS | Functional Module Specification: document that describes an isolated hardware function |
| FRONT-C | Front input chrominance (SVHS) |
| FRONT-DETECT | Front input detection |
| FRONT-Y_CVBS | Front input luminance or CVBS (SVHS) |
| FRS | Functional Requirement Specification: software specification document |
| G-SC1-IN | Green SCART1 in |
| G-SC2-IN | Green SCART2 in |
| G-TXT | Green teletext |
| HA | Horizontal Acquisition: horizontal sync pulse coming out of the HIP |
| HD100 | Horizontal Drive: horizontal sync pulse coming out of the featurebox |
| HDTV | High Definition TV: highest resolution defined by the ATSC standard (1080 lines and 1920 horizontal pixels, referred to as 1080i) The second HDTV standard, 720p x 1280 is not used in EM2E chassis (3fH standard not feasible) |
| Headroom | Extra margin provision to avoid clipping of signals |
| HEATER | Heater (Filament) |
| HFB | Horizontal Flyback Pulse: horizontal sync pulse from large signal deflection |
| HFB+13V | Non rectified output 13V-winding LOT |
| HIP | High-end video Input Processor: video and chroma decoder of EM2E |
| HOP | High-end video Output Processor: video, sync and geometry controller of EM2E |
| HP | Headphone |
| HSI | Hardware Software Interface |

| | |
|---|---|
| IN-FRONT-SNDL | Sound left front in |
| IN-FRONT-SNDR | Sound right front in |
| IN-SC1-B | In SCART1 Blue |
| IN-SC1-G | In SCART1 Green |
| IN-SC1-R | In SCART1 Red |
| IN-SC1-SNDL | In SCART1 sound left |
| IN-SC1-SNDR | In SCART1 sound right |
| IN-SC2-B | In SCART2 Blue |
| IN-SC2-CVBS_Y | In SCART2 CVBS or luminance (SVHS) |
| IN-SC2-FBL | In SCART2 fast blanking |
| IN-SC2-G | In SCART2 Green |
| Interlaced | Scan mode where two fields are used to form one frame. Each field contains half the number of the total amount of lines. The fields are written in "pairs", causing line flicker. |
| IO-BUS | In/Out - Bus |
| Last Status | The settings last chosen by the customer and read and stored in RAM or in the NVM. They are called at start-up of the set to configure it according the customers wishes |
| LDP | Line Deflection Protection |
| LED | Light Emitting Diode |
| LINE-DRIVE | Line drive signal |
| LNA | Low Noise Adapter |
| LSP | Large signal panel |
| MSP | Multistandard Sound Processor: ITT sound decoder of EM2E |
| MUTE | Mute-Line |
| NC | Not Connected |
| NDF | No vertical DeFlection: vertical flyback protection |
| NHF | No Horizontal deflection: horizontal flyback protection |
| NVM | Non Volatile Memory: IC containing TV related data e.g. alignments |
| O/C | Open Circuit |
| ON/OFF LED | On/Off control signal for the LED |
| OSD | On Screen Display |
| OTC | On screen display Teletext and Control; also named Artistic (SAA5800) |
| P50 | Project 50 communication: protocol between TV and peripherals |
| PCB | Printed Circuit board |
| PICNIC | Peripheral Integrated Combined Network IC: main IC for 100 Hz featuring and feature processing |
| PILOT | Pilot Signal |
| PILOTMUTE | Pilot Mute signal |
| Progressive Scan | Scan mode where all scan lines are displayed in one frame at the same time, creating a double vertical resolution. |
| PTP | Picture Tube Panel |
| RAM | Random Access Memory |
| RC | Remote Control |
| RC5 | RC5 signal from the remote control receiver |
| RESET | Reset signal |
| ROM | Read Only Memory |
| SAM | Service Alignment Mode |
| SC | Sandcastle: pulse derived from sync signals |
| SCAVEM | Scan Velocity Modulation |
| S/C | Short Circuit |
| SC1-OUT | SCART output of the MSP audio IC |
| SC2-B-IN | Scart2 Blue in |
| SC2-C-IN | Scart2 chrominance in |
| SC2-OUT | SCART output of the MSP audio IC |
| SIF | Sound Intermediate Frequency |
| SIMM | 80-fold connector between LSP and SSB |
| SLDP | Smart Local Dooming Prevention (HW and SW) |
| SNDL-SC1-IN | Sound left SCART1 in |
| SNDL-SC1-OUT | Sound left SCART1 out |
| SNDL-SC2-IN | Sound left SCART2 in |
| SNDL-SC2-OUT | Sound left SCART2 out |
| SNDR-SC1-IN | Sound right SCART1 in |
| SNDR-SC1-OUT | Sound right SCART1 out |
| SNDR-SC2-IN | Sound right SCART2 out |
| SNDR-SC2-OUT | Sound right SCART2 out |
| SNDS-VL-OUT | Surround sound left variable level out |
| SNDS-VR-OUT | Surround sound right variable level out |
| SNERT | Synchronous No parity Eight bit Reception and Transmit |
| SSB | Small Signal Board |
| STBY | Standby |
| SW | Subwoofer |
| TXT | Teletext |
| TXT DS | Teletext Dual Screen |
| µP | microprocessor |
| VA | Vertical Acquisition |
| $V_{BAT}$ | main supply for deflection (mostly 141 V) |
| VD100 | Vertical Drive: vertical sync pulse from deflection |
| VFB | Vertical Flyback Pulse: vertical sync pulse coming from the feature box |
| VL | Variable Level out: processed audio output towards external amplifier |
| WYSIWYR | What You See Is What You Record: record selection that follows main picture and sound |
| XTAL | Quartz crystal |
| Y-OUT | Luminance-signal to HOP IC |

# 10. Spare parts list

## Large Signal Panel [A]

### Various

| | | |
|---|---|---|
| 0010 | 2422 025 16374 | 2P Male |
| 0020 | 4822 267 10774 | 2P Male |
| 0032 | 4822 492 70788 | IC-SPRING |
| 0037 | 3104 304 21112 | LOT SSB SUPPORT |
| 0045 | 4822 267 10734 | 5P MALE |
| 0065 | 3104 304 22031 | LOT SPACER |
| 0066 | 3104 304 21591 | SCART SUPPORT BRACKET |
| 0150 | 4822 265 11253 | FUSE HOLDER |
| 0153 | 4822 265 11253 | FUSE HOLDER |
| 0317 | 4822 265 20723 | 2P MALE |
| 0324 | 3104 311 01881 | CABLE 7P 480mm |
| 0325 | 2422 025 16382 | 3P Male |
| 0735 | 2422 025 16407 | 3P Male |
| 0736 | 2422 025 16382 | 3P Male |
| 0936 | 2422 025 12485 | 11P Male |
| 0940 | 4822 267 10968 | 11P FEMALE |
| 0943 | 4822 267 10748 | 3P MALE |
| 0945 | 4822 267 10735 | 3P MALE |
| 0946 | 5322 268 90415 | 2P MALE |
| 0947 | 4822 267 10734 | 5P MALE |
| 1001 | 4822 252 60151 | SURGE PROTECT |
| 1002 | 2422 132 07411 | RELAY 1P 5V 5A |
| 1003 | 4822 267 10973 | 1P |
| 1200 | 4822 210 10848 | UV1316/A I U-2 |
| 1205 | 2422 025 16599 | 80P Female SIMM |
| 1501 | 4822 070 34002 | FUSE 4A |
| 1503 | 2422 086 10912 | FUSE 2,5A |
| 1901 | 4822 267 10771 | IC SOCKET 42P |
| 1902 | 4822 267 10982 | 2P |
| 8000 | 4822 320 12525 | CABLE |
| 8001 | 4822 320 20234 | EHT CABLE |
| 8015 | 4822 320 20216 | CABLE |
| | 3122 785 100 | Supply Kit Mains Supply EM2E |
| | 3122 785 100 | Supply Kit Standby Supply EM2E |
| | 3122 785 100 | Line Repair Kit EM2E |

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| | | |
|---|---|---|
| 2101 | 5322 122 32818 | 2.2nF 10% 100V |
| 2102 | 4822 124 40248 | 10µF 20% 63V |
| 2103 | 5322 122 32531 | 100pF 5% 50V |
| 2104 | 4822 123 14025 | 2200µF 20% 16V |
| 2105 | 5322 122 32531 | 100pF 5% 50V |
| 2106 | 5322 126 10223 | 4.7nF 10% 63V |
| 2107 | 5322 122 32818 | 2.2nF 10% 100V |
| 2108 | 4822 121 70162 | 10nF 5% 400V |
| 2109 | 4822 126 13482 | 470nF 80/20% 16V |
| 2110 | 5322 121 42498 | 680nF 5% 63V |
| 2111 | 4822 121 43526 | 47nF 5% 250V |
| 2113 | 4822 122 33127 | 2.2nF 10% 63V |
| 2114 | 4822 126 10206 | 2.2nF 10% 500V |
| 2200 | 4822 124 40196 | 220µF 20% 16V |
| 2201 | 4822 126 14076 | 220nF 25V |
| 2202 | 4822 126 13473 | 220nF 80-20% 50V |
| 2203 | 4822 124 41584 | 100µF 20% 10V |
| 2400 | 4822 124 11575 | 47µF 20% 160V |
| 2412 | 4822 126 13751 | 47nF 10% 63V |
| 2413 | 4822 124 12255 | 10µF 20% 50V |
| 2414 | 4822 126 13751 | 47nF 10% 63V |
| 2415 | 4822 122 33575 | 220pF 5% 63V |
| 2417 | 4822 126 14076 | 220nF 25V |
| 2419 | 4822 126 14237 | 470pF 10% 2KV |
| 2420 | 4822 121 70594 | 1nF 5% 2KV |
| 2421 | 2022 333 00086 | 470nF 5% 250V |
| 2421 | 4822 121 42634 | 560nF 5% 250V |
| 2425 | 4822 121 10526 | 9N1 5% 2KV |
| 2425 | 4822 121 70435 | 10nF 5% 2KV |
| 2426 | 4822 121 10653 | 22nF 5% 630V |
| 2426 | 4822 121 10658 | 24nF 5% 630V |
| 2429 | 4822 121 43343 | 4.7nF 10% 400V |
| 2430 | 4822 121 41857 | 10nF 5% 250V |
| 2431 | 4822 121 42077 | 6.8nF 10% 400V |
| 2431 | 4822 126 13599 | 3.3nF 10% 500V |
| 2433 | 2022 333 00086 | 470nF 5% 250V |
| 2433 | 4822 121 42634 | 560nF 5% 250V |
| 2435 | 4822 121 10526 | 9N1 5% 2KV |
| 2450 | 5322 121 42578 | 100nF 5% 250V |
| 2455 | 5322 126 10511 | 1nF 5% 50V |
| 2460 | 4822 124 40784 | 3300µF 20% 16V |
| 2461 | 4822 122 31177 | 470pF 10% 500V |
| 2462 | 4822 124 80061 | 1000µF 20% 25V |
| 2463 | 4822 122 31177 | 470pF 10% 500V |
| 2464 | 4822 124 80061 | 1000µF 20% 25V |
| 2465 | 4822 122 31177 | 470pF 10% 500V |
| 2468 | 4822 124 12297 | 4.7µF 20% 350V |
| 2469 | 4822 122 31177 | 470pF 10% 500V |
| 2480 | 4822 121 51442 | 2.2nF 10% 50V |
| 2489 | 4822 124 40433 | 47µF 20% 25V |
| 2490 | 4822 122 33891 | 3.3nF 10% 63V |
| 2491 | 4822 124 40768 | 0.47µF 20% 100V |
| 2492 | 4822 126 14076 | 220nF 25V |
| 2495 | 4822 126 13838 | 100nF 20% 50V |
| 2499 | 4822 126 13838 | 100nF 20% 50V |
| 2501 | 4822 126 11524 | 1.5nF 10% 1KV |
| 2502 | 5322 122 32818 | 2.2nF 10% 100V |
| 2503 | 5322 121 42489 | 33nF 5% 250V |
| 2505 | 4822 126 14504 | 3.3nF 20% 250V |
| 2507 | 4822 126 13589 | 470nF 275V |
| 2508 | 4822 126 14153 | 2.2nF 10%B 1KV |
| 2509 | 4822 126 14153 | 2.2nF 10%B 1KV |
| 2510 | 4822 124 12415 | 220µF 20% 400V |
| 2512 | 4822 124 12056 | 1000µF 20% 35V |
| 2513 | 5322 122 34099 | 470pF 10% 63V |
| 2514 | 5322 122 31863 | 63V 330pF 5% |
| 2515 | 4822 124 11575 | 47µF 20% 160V |
| 2518 | 4822 126 11308 | 47pF 5% 500V |
| 2519 | 5322 122 32818 | 2.2nF 10% 100V |
| 2520 | 4822 126 14585 | 100nF 10% 50V |
| 2521 | 4822 122 33216 | 270pF 5% 50V |
| 2528 | 4822 126 14585 | 100nF 10% 50V |
| 2530 | 4822 126 14585 | 100nF 10% 50V |
| 2531 | 4822 122 31169 | 1.5nF 10% 500V |
| 2535 | 4822 121 43913 | 470nF 10% 100V |
| 2536 | 4822 126 10206 | 2.2nF 10% 500V |
| 2537 | 4822 124 11913 | 22nF 20% 275V |
| 2538 | 5322 126 10223 | 4.7nF 10% 63V |
| 2600 | 4822 121 43913 | 470nF 10% 100V |
| 2601 | 4822 121 51252 | 470nF 5% 63V |
| 2602 | 4822 124 40433 | 47µF 20% 25V |
| 2603 | 4822 122 33177 | 10nF 20% 50V |
| 2604 | 4822 124 40248 | 10µF 20% 63V |
| 2610 | 4822 122 33127 | 2.2nF 10% 63V |
| 2620 | 4822 126 14076 | 220nF 25V |
| 2621 | 4822 126 13838 | 100nF 20% 50V |
| 2622 | 4822 124 40255 | 100µF 20% 63V |
| 2624 | 4822 121 51252 | 470nF 5% 63V |
| 2625 | 4822 121 51252 | 470nF 5% 63V |
| 2627 | 5322 124 40641 | 10µF 20% 100V |
| 2642 | 4822 124 40255 | 100µF 20% 63V |
| 2700 | 4822 124 21913 | 1µF 20% 63V |
| 2701 | 4822 124 21913 | 1µF 20% 63V |
| 2730 | 4822 124 81151 | 22µF 50V |
| 2731 | 4822 124 81151 | 22µF 50V |
| 2732 | 4822 124 40255 | 100µF 20% 63V |
| 2733 | 4822 124 40255 | 100µF 20% 63V |
| 2734 | 4822 124 81151 | 22µF 50V |
| 2735 | 4822 124 81151 | 22µF 50V |
| 2736 | 5322 122 31865 | 1.5nF 10% 63V |
| 2737 | 5322 122 31865 | 1.5nF 10% 63V |
| 2756 | 4822 126 13751 | 47nF 10% 63V |
| 2760 | 4822 124 80061 | 1000µF 20% 25V |
| 2761 | 4822 124 80061 | 1000µF 20% 25V |
| 2765 | 4822 124 40255 | 100µF 20% 63V |
| 2767 | 4822 124 40255 | 100µF 20% 63V |
| 2782 | 4822 126 13751 | 47nF 10% 63V |
| 2902 | 5322 122 31863 | 330pF 5% 63V |
| 2903 | 5322 122 31863 | 330pF 5% 63V |
| 2906 | 5322 122 32531 | 100pF 5% 50V |
| 2909 | 5322 122 31863 | 330pF 5% 63V |
| 2910 | 5322 122 32531 | 100pF 5% 50V |
| 2912 | 4822 124 40248 | 10µF 20% 63V |
| 2913 | 4822 126 14585 | 100nF 10% 50V |
| 2915 | 5322 122 31863 | 330pF 5% 63V |
| 2916 | 5322 122 31863 | 330pF 5% 63V |
| 2917 | 5322 122 32531 | 100pF 5% 50V |
| 2919 | 5322 122 31863 | 330pF 5% 63V |
| 2920 | 5322 122 32531 | 100pF 5% 50V |
| 2923 | 5322 122 31863 | 330pF 5% 63V |
| 2925 | 5322 122 31863 | 330pF 5% 63V |
| 2926 | 4822 124 81044 | 470µF 20% 6.3V |
| 2927 | 4822 124 40433 | 47µF 20% 25V |
| 2941 | 5322 122 31865 | 1.5nF 10% 63V |
| 2942 | 5322 122 31865 | 1.5nF 10% 63V |
| 2951 | 4822 124 21913 | 1µF 20% 63V |
| 2952 | 4822 126 13751 | 47nF 10% 63V |
| 2953 | 4822 126 13751 | 47nF 10% 63V |

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| | | |
|---|---|---|
| 3101 | 4822 053 20106 | 10M 5% 0.25W |
| 3102 | 4822 050 26801 | 680Ω 1% 0.6W |
| 3103 | 4822 050 26801 | 680Ω 1% 0.6W |
| 3104 | 4822 116 52195 | 47Ω 5% 0.5W |
| 3105 | 4822 050 26801 | 680Ω 1% 0.6W |
| 3106 | 4822 116 52256 | 2k2 5% 0.5W |
| 3107 | 4822 116 52256 | 2k2 5% 0.5W |
| 3108 | 4822 116 52182 | 15Ω 5% 0.5W |
| 3110 | 4822 052 10109 | 10Ω 5% 0.33W |
| 3113 | 4822 116 52182 | 15Ω 5% 0.5W |
| 3114 | 4822 116 83872 | 220Ω 5% 0.5W |
| 3117 | 4822 116 52195 | 47Ω 5% 0.5W |
| 3118 | 4822 050 24708 | 4Ω7 1% 0.6W |
| 3120 | 4822 051 20109 | 10Ω 5% 0.1W |
| 3123 | 4822 116 52176 | 10Ω 5% 0.5W |
| 3124 | 4822 116 52199 | 68Ω 5% 0.5W |
| 3125 | 4822 116 52182 | 15Ω 5% 0.5W |
| 3126 | 4822 050 21003 | 10k 1% 0.6W |
| 3127 | 4822 116 52289 | 5k6 5% 0.5W |
| 3200 | 4822 051 20101 | 100Ω 5% 0.1W |
| 3201 | 4822 051 20101 | 100Ω 5% 0.1W |
| 3250 | 4822 051 20223 | 22k 5% 0.1W |
| 3402 | 4822 117 10837 | 100k 1% 0.1W |
| 3403 | 4822 051 20101 | 100Ω 5% 0.1W |
| 3404 | 4822 051 20471 | 470Ω 5% 0.1W |
| 3406 | 4822 051 20101 | 100Ω 5% 0.1W |
| 3407 | 4822 117 10833 | 10k 1% 0.1W |
| 3410 | 4822 051 20479 | 47Ω 5% 0.1W |
| 3411 | 4822 116 52193 | 39Ω 5% 0.5W |
| 3414 | 4822 117 13577 | 330Ω 1% 1.25W |
| 3415 | 3198 012 31590 | 15Ω 5% 3W |
| 3415 | 4822 117 12836 | 12Ω 5% 3W |
| 3417 | 4822 116 52176 | 10Ω 5% 0.5W |
| 3418 | 4822 050 22704 | 270k 1% 0.6W |
| 3431 | 4822 052 10101 | 100Ω 5% 0.33W |
| 3431 | 4822 052 10221 | 220Ω 5% 0.33W |
| 3450 | 4822 116 52303 | 8k2 5% 0.5W |
| 3450 | 4822 116 83961 | 6k8 5% |
| 3451 | 4822 116 52257 | 22k 5% 0.5W |
| 3460 | 4822 052 10108 | 1Ω 5% 0.33W |
| 3461 | 4822 052 10108 | 1Ω 5% 0.33W |
| 3462 | 4822 052 10108 | 1Ω 5% 0.33W |
| 3463 | 4822 052 10108 | 1Ω 5% 0.33W |
| 3464 | 4822 052 10108 | 1Ω 5% 0.33W |
| 3465 | 4822 052 10108 | 1Ω 5% 0.33W |
| 3466 | 4822 052 10688 | 6Ω8 5% 0.33W |
| 3466 | 4822 052 10828 | 8Ω2 5% 0.33W |
| 3467 | 4822 052 10108 | 1Ω 5% 0.33W |
| 3468 | 4822 052 11688 | 6Ω8 5% 0.5W |
| 3475 | 4822 116 52175 | 100Ω 5% 0.5W |
| 3481 | 4822 116 52175 | 100Ω 5% 0.5W |
| 3483 | 4822 051 10102 | 1k 2% 0.25W |
| 3484 | 4822 117 11139 | 1k5 1% 0.1W |
| 3485 | 4822 117 11454 | 820Ω 1% 0.1W |
| 3486 | 4822 117 12955 | 2k7 1% 0.1W |
| 3487 | 4822 117 11449 | 2k2 1% 0.1W |
| 3488 | 4822 116 52272 | 330k 5% 0.5W |
| 3488 | 4822 116 83874 | 220k 5% 0.5W |
| 3489 | 4822 117 11449 | 2k2 1% 0.1W |
| 3491 | 4822 050 21504 | 150k 1% 0.6W |
| 3495 | 4822 051 20683 | 68k 5% 0.1W |
| 3496 | 4822 117 11507 | 6k8 1% 0.1W |
| 3497 | 4822 117 10834 | 47k 1% 0.1W |
| 3498 | 4822 051 20472 | 4k7 5% 0.1W |
| 3499 | 4822 117 10837 | 100k 1% 0.1W |
| 3500 | 4822 117 12074 | 1Ω5 10% 7W |
| 3501 | 3198 013 04710 | 470Ω 2% 1/2W |
| 3504 | 4822 116 83883 | 470Ω 5% 0.5W |
| 3507 | 4822 050 21604 | 160k 1% 0.6W |
| 3508 | 3198 012 16820 | 6.8k 1W |
| 3509 | 2322 595 90021 | VDR DC 1M A/495V |
| 3510 | 4822 117 11951 | 2k 1% 0.1W |
| 3511 | 4822 116 52276 | 3k9 5% 0.5W |
| 3512 | 4822 116 52297 | 68k 5% 0.5W |
| 3513 | 4822 116 52272 | 330k 5% 0.5W |
| 3514 | 4822 053 10108 | 1Ω 5% 1W |
| 3515 | 4822 053 10108 | 1Ω 5% 1W |
| 3516 | 4822 116 10075 | 9Ω 220V |
| 3518 | 4822 050 11204 | 120k 1% 0.4W |
| 3519 | 4822 051 20223 | 22k 5% 0.1W |
| 3520 | 4822 053 11333 | 33k 5% 2W |

| | | |
|---|---|---|
| 3521 | 4822 117 10118 | 1M 5% 0.5W |
| 3522 | 4822 116 83961 | 6k8 5% |
| 3523 | 4822 051 20105 | 1M 5% 0.1W |
| 3524 | 4822 051 10102 | 1k 2% 0.25W |
| 3525 | 4822 051 20479 | 47Ω 5% 0.1W |
| 3526 | 4822 116 83303 | 1Ω 2W |
| 3527 | 4822 117 11454 | 820Ω 1% 0.1W |
| 3528 | 4822 117 10833 | 10k 1% 0.1W |
| 3529 | 4822 051 20472 | 4k7 5% 0.1W |
| 3530 | 4822 116 52297 | 68k 5% 0.5W |
| 3531 | 4822 117 10833 | 10k 1% 0.1W |
| 3533 | 4822 051 20159 | 15Ω 5% 0.1W |
| 3535 | 4822 051 20273 | 27k 5% 0.1W |
| 3536 | 4822 117 10837 | 100k 1% 0.1W |
| 3537 | 4822 117 10833 | 10k 1% 0.1W |
| 3538 | 4822 051 20332 | 3k3 5% 0.1W |
| 3539 | 4822 117 10833 | 10k 1% 0.1W |
| 3540 | 4822 117 10834 | 47k 1% 0.1W |
| 3541 | 4822 117 10833 | 10k 1% 0.1W |
| 3542 | 3198 012 11570 | 0Ω15 5% 1W |
| 3543 | 4822 051 20478 | 4Ω7 5% 0.1W |
| 3544 | 4822 051 20479 | 47Ω 5% 0.1W |
| 3600 | 4822 050 22205 | 2M2 1% 0.6W |
| 3601 | 4822 050 22205 | 2M2 1% 0.6W |
| 3602 | 4822 051 20332 | 3k3 5% 0.1W |
| 3603 | 4822 101 11319 | 100Ω LIN |
| 3605 | 4822 051 20273 | 27k 5% 0.1W |
| 3606 | 4822 051 10102 | 1k 2% 0.25W |
| 3607 | 4822 051 20223 | 22k 5% 0.1W |
| 3608 | 4822 051 20223 | 22k 5% 0.1W |
| 3609 | 4822 101 11193 | 47k 30% LIN 0.1W |
| 3610 | 4822 051 20683 | 68k 5% 0.1W |
| 3611 | 4822 051 20822 | 8k2 5% 0.1W |
| 3612 | 4822 051 20274 | 270k 5% 0.1W |
| 3613 | 4822 051 20274 | 270k 5% 0.1W |
| 3614 | 4822 050 21005 | 1M 1% 0.6W |
| 3615 | 4822 050 18204 | 820k 1% 0.4W |
| 3615 | 4822 116 52292 | 560k 5% 0.5W |
| 3616 | 4822 116 52285 | 470k 5% 0.5W |
| 3617 | 4822 050 11002 | 1k 1% 0.4W |
| 3618 | 4822 051 10102 | 1k 2% 0.25W |
| 3619 | 4822 051 20562 | 5k6 5% 0.1W |
| 3620 | 4822 116 80176 | 1Ω 5% 0.5W |
| 3620 | 4822 116 80676 | 1Ω5 5% 0.5W |
| 3621 | 4822 116 80176 | 1Ω 5% 0.5W |
| 3622 | 4822 116 80176 | 1Ω 5% 0.5W |
| 3623 | 4822 117 10834 | 47k 1% 0.1W |
| 3624 | 4822 052 10158 | 1Ω5 5% 0.33W |
| 3625 | 4822 116 83872 | 220Ω 5% 0.5W |
| 3626 | 4822 116 83872 | 220Ω 5% 0.5W |
| 3627 | 4822 050 21003 | 10k 1% 0.6W |
| 3630 | 4822 051 10102 | 1k 2% 0.25W |
| 3631 | 4822 051 20332 | 3k3 5% 0.1W |
| 3632 | 4822 117 10833 | 10k 1% 0.1W |
| 3633 | 4822 050 21003 | 10k 1% 0.6W |
| 3644 | 4822 117 10833 | 10k 1% 0.1W |
| 3645 | 4822 116 52245 | 150k 5% 0.5W |
| 3652 | 4822 051 20101 | 100Ω 5% 0.1W |
| 3701 | 4822 117 10833 | 10k 1% 0.1W |
| 3702 | 4822 117 10833 | 10k 1% 0.1W |
| 3730 | 4822 117 10833 | 10k 1% 0.1W |
| 3731 | 4822 117 10833 | 10k 1% 0.1W |
| 3732 | 4822 051 20822 | 8k2 5% 0.1W |
| 3733 | 4822 051 20822 | 8k2 5% 0.1W |
| 3734 | 4822 117 10834 | 47k 1% 0.1W |
| 3735 | 4822 117 10834 | 47k 1% 0.1W |
| 3736 | 4822 051 10102 | 1k 2% 0.25W |
| 3737 | 4822 051 10102 | 1k 2% 0.25W |
| 3738 | 4822 117 11148 | 56k 1% 0.1W |
| 3739 | 4822 117 11148 | 56k 1% 0.1W |
| 3740 | 4822 051 20683 | 68k 5% 0.1W |
| 3741 | 4822 051 20683 | 68k 5% 0.1W |
| 3742 | 4822 116 52199 | 68Ω 5% 0.5W |
| 3743 | 4822 116 52199 | 68Ω 5% 0.5W |
| 3756 | 4822 117 10833 | 10k 1% 0.1W |
| 3762 | 4822 051 20828 | 8Ω2 5% 0.1W |
| 3765 | 4822 117 11507 | 6k8 1% 0.1W |
| 3770 | 4822 117 10834 | 47k 1% 0.1W |
| 3771 | 4822 116 83933 | 15k 1% 0.1W |
| 3773 | 4822 116 83933 | 15k 1% 0.1W |
| 3789 | 4822 051 20828 | 8Ω2 5% 0.1W |
| 3790 | 4822 051 10102 | 1k 2% 0.25W |
| 3792 | 4822 051 10102 | 1k 2% 0.25W |
| 3900 | 4822 116 83868 | 150Ω 5% 0.5W |
| 3901 | 4822 117 10353 | 150Ω 1% 0.1W |
| 3902 | 4822 117 10353 | 150Ω 1% 0.1W |
| 3903 | 4822 117 10353 | 150Ω 1% 0.1W |
| 3905 | 4822 116 83883 | 470Ω 5% 0.5W |
| 3906 | 4822 116 52201 | 75Ω 5% 0.5W |
| 3907 | 4822 051 20561 | 560Ω 5% 0.1W |
| 3908 | 4822 116 52201 | 75Ω 5% 0.5W |
| 3909 | 4822 116 52201 | 75Ω 5% 0.5W |
| 3910 | 4822 116 52201 | 75Ω 5% 0.5W |
| 3911 | 4822 116 52201 | 75Ω 5% 0.5W |
| 3913 | 4822 116 52201 | 75Ω 5% 0.5W |
| 3915 | 4822 116 52201 | 75Ω 5% 0.5W |
| 3916 | 4822 051 20822 | 8k2 5% 0.1W |
| 3918 | 4822 051 20392 | 3k9 5% 0.1W |
| 3919 | 4822 051 10102 | 1k 2% 0.25W |
| 3920 | 4822 051 10102 | 1k 2% 0.25W |
| 3921 | 4822 117 10353 | 150Ω 1% 0.1W |
| 3922 | 4822 117 10353 | 150Ω 1% 0.1W |
| 3923 | 4822 117 10353 | 150Ω 1% 0.1W |
| 3924 | 4822 117 10353 | 150Ω 1% 0.1W |
| 3925 | 4822 052 10688 | 6Ω8 5% 0.33W |
| 3928 | 4822 051 20101 | 100Ω 5% 0.1W |
| 3929 | 4822 117 10833 | 10k 1% 0.1W |
| 3930 | 4822 051 20561 | 560Ω 5% 0.1W |
| 3932 | 4822 116 52201 | 75Ω 5% 0.5W |
| 3935 | 4822 116 52201 | 75Ω 5% 0.5W |
| 3936 | 4822 117 10353 | 150Ω 1% 0.1W |
| 3937 | 4822 117 10353 | 150Ω 1% 0.1W |
| 3940 | 4822 117 10353 | 150Ω 1% 0.1W |
| 3941 | 4822 117 10353 | 150Ω 1% 0.1W |
| 3942 | 4822 051 20822 | 8k2 5% 0.1W |
| 3944 | 4822 051 10102 | 1k 2% 0.25W |
| 3945 | 4822 051 20392 | 3k9 5% 0.1W |
| 3946 | 4822 051 10102 | 1k 2% 0.25W |
| 3970 | 4822 051 20471 | 470Ω 5% 0.1W |
| 3971 | 4822 117 10833 | 10k 1% 0.1W |
| 3972 | 4822 117 10833 | 10k 1% 0.1W |
| 3991 | 4822 116 52175 | 100Ω 5% 0.5W |
| 3992 | 4822 051 20101 | 100Ω 5% 0.1W |
| 3993 | 4822 051 20101 | 100Ω 5% 0.1W |
| 3994 | 4822 116 52175 | 100Ω 5% 0.5W |
| 3995 | 4822 116 52175 | 100Ω 5% 0.5W |
| 3996 | 4822 116 52175 | 100Ω 5% 0.5W |
| 3997 | 4822 116 52175 | 100Ω 5% 0.5W |
| 3998 | 4822 116 52175 | 100Ω 5% 0.5W |
| 4xxx | 4822 051 10008 | 0Ω 5% 0.25W |
| 4xxx | 4822 051 20008 | 0Ω 5% 0.25W |
| 9220 | 4822 051 20008 | JUMPER |
| 9225 | 4822 051 20008 | JUMPER |
| 9723 | 4822 051 20008 | JUMPER |
| 9724 | 4822 051 20008 | JUMPER |

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|---|---|---|
| 5101 | 4822 146 11065 | STANDBY TFM |
| 5102 | 4822 157 70436 | 8.2µH |
| 5103 | 4822 526 10704 | BEAD 50MHz |
| 5104 | 4822 157 11411 | BEAD 100MHz |
| 5105 | 4822 526 10704 | BEAD 100MHz |
| 5200 | 4822 157 11775 | 6.8µH 5% |
| 5400 | 4822 157 11869 | 33µH 10% |
| 5410 | 4822 146 11065 | TFM SIG FIX |
| 5411 | 4822 157 71097 | 0.56µH |
| 5421 | 4822 157 11204 | COIL LINE CORR.(29") |
| 5421 | 4822 157 11839 | COIL LINE CORR. (28") |
| 5421 | 4822 157 11841 | COIL LINE CORR. (28"WS,32"WS) |
| 5422 | 4822 157 71535 | COIL BRIDGE |
| 5424 | 4822 157 63255 | COIL BRIDGE |
| 5430 | 8204 000 73321 | LOT (29") |
| 5430 | 8228 001 33243 | LOT (25",28") |
| 5461 | 4822 157 11411 | BEAD 100MHz |
| 5463 | 4822 157 11411 | BEAD 100MHz |
| 5465 | 4822 157 11411 | BEAD 100MHz |
| 5466 | 4822 157 71467 | 39U 10% |
| 5467 | 4822 157 11411 | BEAD 100MHz |
| 5504 | 2422 549 43286 | MAINS 35mH 1A5 |
| 5505 | 4822 157 11411 | BEAD 100MHz |
| 5506 | 2422 531 98042 | TFM W8085-002 Y |
| 5510 | 4822 157 11411 | BEAD 100MHz |
| 5620 | 4822 157 11771 | 0.09µH 10% |

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|---|---|---|
| 6103 | 4822 130 42488 | BYD33D |
| 6105 | 4822 130 34281 | BZX79-B15 |
| 6106 | 4822 130 34499 | BZX79-B20 |
| 6108 | 4822 130 30621 | 1N4148 |
| 6109 | 4822 130 31083 | BYW55 |
| 6111 | 4822 130 32715 | SB340 |
| 6120 | 4822 130 30621 | 1N4148 |
| 6121 | 4822 130 30621 | 1N4148 |
| 6122 | 3198 010 53980 | BZX79-B3V9 |
| 6200 | 9322 149 10685 | BZM55-C33 |
| 6201 | 4822 130 83757 | BAS216 |
| 6202 | 4822 130 83757 | BAS216 |
| 6203 | 4822 130 10852 | BZX284-C6V8 |
| 6204 | 4822 130 10852 | BZX284-C6V8 |
| 6205 | 4822 130 83757 | BAS216 |
| 6405 | 4822 130 11027 | BZX284-C33 |
| 6406 | 4822 130 83757 | BAS216 |
| 6407 | 4822 130 83757 | BAS216 |
| 6408 | 4822 130 42488 | BYD33D |
| 6421 | 4822 130 10753 | BY359X-1500 |
| 6422 | 4822 130 10218 | BY229X-800 |
| 6442 | 9322 129 42685 | BZM55-C15 |
| 6461 | 4822 130 82512 | BYV29F-400 |
| 6462 | 4822 130 41487 | BYV95C |
| 6464 | 5322 130 31938 | BYV27-200 |
| 6468 | 4822 130 42488 | BYD33D |
| 6480 | 4822 130 42488 | BYD33D |
| 6481 | 4822 130 31024 | BZX79-B18 |
| 6482 | 4822 130 83757 | BAS216 |
| 6499 | 4822 130 83757 | BAS216 |
| 6501 | 4822 130 31083 | BYW55 |
| 6502 | 4822 130 31083 | BYW55 |
| 6503 | 4822 130 31083 | BYW55 |
| 6504 | 4822 130 31083 | BYW55 |
| 6505 | 4822 130 34281 | BZX79-B15 |
| 6506 | 4822 130 30621 | 1N4148 |
| 6507 | 4822 130 80791 | BYV28-200/20 |
| 6508 | 4822 130 11415 | BYV28-400/20 |
| 6510 | 4822 130 34281 | BZX79-B15 |
| 6511 | 4822 130 83757 | BAS216 |
| 6512 | 4822 130 83757 | BAS216 |
| 6514 | 5322 130 31932 | BZT03-C200 |
| 6515 | 4822 130 32904 | BZV85-C5V6 |
| 6516 | 4822 130 83757 | BAS216 |
| 6517 | 4822 130 31983 | BAT85 |
| 6518 | 4822 130 83757 | BAS216 |
| 6520 | 4822 130 42488 | BYD33D |
| 6521 | 4822 130 83757 | BAS216 |
| 6522 | 4822 130 83757 | BAS216 |
| 6600 | 4822 130 31983 | BAT85 |
| 6616 | 4822 130 83757 | BAS216 |
| 6619 | 4822 130 42488 | BYD33D |
| 6620 | 5322 130 31938 | BYV27-200 |
| 6621 | 4822 130 42488 | BYD33D |
| 6622 | 5322 130 33635 | BZV85-C8V2 |
| 6623 | 4822 130 83757 | BAS216 |

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|---|---|---|
| 7100 | 4822 130 44568 | BC557B |
| 7101 | 4822 130 40959 | BC547B |
| 7102 | 4822 130 11417 | STP3NB60FP |
| 7104 | 4822 130 11418 | TCDT1102G |
| 7407 | 4822 130 60511 | BC847B |
| 7408 | 9332 592 40126 | BC368 |
| 7409 | 4822 130 60511 | BC847B |
| 7421 | 4822 130 63666 | BU2520DF |
| 7480 | 4822 130 11417 | STP3NB60FP |
| 7481 | 4822 130 44568 | BC557B |
| 7482 | 4822 130 11418 | TCDT1102G |
| 7499 | 4822 130 60373 | BC856B |
| 7502 | 4822 130 61675 | BF487 |
| 7504 | 9322 126 65687 | STP5NB60FP |
| 7505 | 4822 130 60373 | BC856B |
| 7506 | 4822 209 81397 | TL431CLPST |
| 7510 | 4822 130 60511 | BC847B |
| 7511 | 4822 130 60373 | BC856B |
| 7528 | 4822 130 40981 | BC337-25 |
| 7529 | 4822 130 60511 | BC847B |
| 7600 | 4822 130 44461 | BC546B |
| 7602 | 4822 130 60511 | BC847B |
| 7603 | 4822 130 60373 | BC856B |
| 7605 | 4822 130 60511 | BC847B |
| 7606 | 4822 130 60511 | BC847B |
| 7610 | 4822 130 11418 | TCDT1102G |
| 7620 | 4822 209 90009 | TDA8177 |
| 7641 | 4822 130 60511 | BC847B |
| 7652 | 4822 130 60511 | BC847B |
| 7720 | 4822 130 60511 | BC847B |
| 7721 | 4822 130 60511 | BC847B |
| 7722 | 4822 130 60373 | BC856B |
| 7723 | 4822 130 60373 | BC856B |
| 7724 | 4822 130 60511 | BC847B |
| 7725 | 4822 130 60511 | BC847B |
| 7730 | 4822 130 60511 | BC847B |
| 7750 | 4822 209 32269 | TDA2616/N1 |
| 7900 | 4822 130 40959 | BC547B |
| 7901 | 4822 130 40959 | BC547B |
| 7905 | 9332 592 40126 | BC368 |
| 7906 | 4822 209 12334 | L4940V85 |
| 7907 | 4822 130 60511 | BC847B |

## Small Signal Panel [B]

### Various

| | | |
|---|---|---|
| 1001 | 2422 543 89022 | RES XTL 6M000 |
| 1301 | 2422 540 98456 | RES 12MHz |
| 1305 | 2422 543 01092 | RES XTL 4M433619 |
| 1308 | 2422 543 01097 | RES XTL 3M579545 |
| 1405 | 2422 549 44369 | FIL SAW 38MHz |
| 1407 | 2422 549 44324 | FIL TPWCC04BS |
| 1408 | 2422 549 44372 | FIL SAW 38MHz |
| 1409 | 2422 025 16542 | 2P MALE |
| 1651 | 2422 543 89019 | RES XTL 8M432 |
| 1701 | 2422 543 89018 | RES XTL 12MHz |

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|---|---|---|
| 2001 | 4822 126 11671 | 33pF |
| 2002 | 4822 126 11669 | 27pF |
| 2003 | 4822 126 13879 | 220nF 20% 16V |
| 2004 | 4822 126 13879 | 220nF 20% 16V |
| 2005 | 4822 126 14305 | 100nF 10% 16V |
| 2006 | 4822 126 14305 | 100nF 10% 16V |
| 2007 | 4822 126 14305 | 100nF 10% 16V |
| 2008 | 4822 126 14305 | 100nF 10% 16V |
| 2009 | 4822 122 33777 | 47pF 5% 63V |
| 2010 | 4822 122 33777 | 47pF 5% 63V |
| 2011 | 4822 122 33777 | 47pF 5% 63V |
| 2012 | 4822 122 33777 | 47pF 5% 63V |
| 2013 | 4822 124 12095 | 100µF 20% 16V |
| 2014 | 4822 126 14305 | 100nF 10% 16V |
| 2015 | 4822 126 14305 | 100nF 10% 16V |
| 2016 | 4822 124 12095 | 100µF 20% 16V |
| 2017 | 4822 126 14305 | 100nF 10% 16V |
| 2019 | 4822 126 14305 | 100nF 10% 16V |
| 2020 | 4822 126 13883 | 220pF 5% 50V |
| 2022 | 4822 126 14305 | 100nF 10% 16V |
| 2023 | 4822 126 14305 | 100nF 10% 16V |
| 2024 | 4822 126 14305 | 100nF 10% 16V |
| 2025 | 4822 126 14305 | 100nF 10% 16V |
| 2026 | 4822 126 14305 | 100nF 10% 16V |
| 2027 | 4822 126 14305 | 100nF 10% 16V |
| 2028 | 4822 126 14305 | 100nF 10% 16V |
| 2029 | 4822 126 14305 | 100nF 10% 16V |
| 2031 | 4822 126 14305 | 100nF 10% 16V |
| 2032 | 4822 126 14305 | 100nF 10% 16V |
| 2033 | 4822 126 14226 | 82pF 5% 50V |
| 2034 | 4822 126 14226 | 82pF 5% 50V |
| 2035 | 4822 126 14226 | 82pF 5% 50V |
| 2036 | 4822 126 14226 | 82pF 5% 50V |
| 2037 | 4822 126 14226 | 82pF 5% 50V |
| 2038 | 4822 126 14305 | 100nF 10% 16V |
| 2300 | 4822 124 12095 | 100µF 20% 16V |
| 2303 | 5322 126 11583 | 10nF 10% 50V |
| 2304 | 4822 122 33741 | 10pF 10% 50V |
| 2306 | 4822 126 13881 | 470pF 5% 50V |
| 2307 | 4822 126 14305 | 100nF 10% 16V |
| 2308 | 4822 122 33741 | 10pF 10% 50V |
| 2313 | 4822 121 70159 | 0.1µF 16V |
| 2314 | 4822 124 12095 | 100µF 20% 16V |
| 2315 | 4822 126 14305 | 100nF 10% 16V |
| 2317 | 4822 126 14491 | 2.2µF 10V |
| 2318 | 4822 126 14494 | 22nF 10% 25V |
| 2319 | 5322 126 11583 | 10nF 10% 50V |
| 2320 | 4822 122 33741 | 10pF 10% 50V |
| 2321 | 4822 126 14305 | 100nF 10% 16V |
| 2322 | 4822 126 14305 | 100nF 10% 16V |
| 2323 | 4822 126 14305 | 100nF 10% 16V |
| 2324 | 5322 126 11583 | 10nF 10% 50V |
| 2325 | 4822 126 14305 | 100nF 10% 16V |
| 2328 | 4822 122 33761 | 22pF 5% 50V |
| 2329 | 4822 126 14305 | 100nF 10% 16V |
| 2330 | 4822 126 14305 | 100nF 10% 16V |
| 2331 | 4822 126 14305 | 100nF 10% 16V |
| 2332 | 4822 126 14305 | 100nF 10% 16V |
| 2333 | 4822 126 14491 | 2.2µF 10V |
| 2334 | 4822 126 14491 | 2.2µF 10V |
| 2335 | 4822 124 80349 | 47µF 20% 6.3V |
| 2336 | 4822 126 14491 | 2.2µF 10V |
| 2338 | 5322 126 11583 | 10nF 10% 50V |
| 2340 | 4822 124 23002 | 10µF 16V |
| 2341 | 4822 124 12095 | 100µF 20% 16V |
| 2350 | 4822 126 14305 | 100nF 10% 16V |
| 2351 | 4822 126 14305 | 100nF 10% 16V |
| 2352 | 4822 126 14305 | 100nF 10% 16V |
| 2356 | 4822 126 14305 | 100nF 10% 16V |
| 2357 | 4822 126 14305 | 100nF 10% 16V |
| 2358 | 5322 126 11579 | 3.3nF 10% 63V |
| 2359 | 4822 122 33752 | 15pF 5% 50V |
| 2361 | 3198 016 31580 | 1P5 50V |
| 2362 | 4822 126 11663 | 12pF |
| 2365 | 4822 126 14305 | 100nF 10% 16V |
| 2366 | 4822 126 14305 | 100nF 10% 16V |
| 2367 | 4822 126 14305 | 100nF 10% 16V |
| 2368 | 4822 126 14305 | 100nF 10% 16V |
| 2369 | 4822 126 14305 | 100nF 10% 16V |
| 2370 | 4822 126 14305 | 100nF 10% 16V |
| 2371 | 4822 126 13193 | 4.7nF 10% 63V |
| 2372 | 4822 126 14043 | 1µF 20% 16V |
| 2373 | 4822 126 14305 | 100nF 10% 16V |
| 2374 | 4822 126 14491 | 2.2µF 10V |
| 2375 | 4822 126 14494 | 22nF 10% 25V |
| 2376 | 4822 126 14305 | 100nF 10% 16V |
| 2377 | 4822 124 12095 | 100µF 20% 16V |
| 2378 | 4822 126 14305 | 100nF 10% 16V |
| 2384 | 4822 126 14305 | 100nF 10% 16V |
| 2406 | 4822 126 13883 | 220pF 5% 50V |
| 2407 | 4822 126 13956 | 68pF 5% 63V |
| 2408 | 3198 016 32780 | 2P7 50V |
| 2409 | 4822 126 14491 | 2.2µF 10V |
| 2410 | 4822 126 14472 | 1µF 10% 10V |
| 2411 | 4822 126 14305 | 100nF 10% 16V |
| 2412 | 4822 126 13193 | 4.7nF 10% 63V |
| 2413 | 4822 124 80151 | 47µF 16V |
| 2417 | 3198 017 44740 | 470nF 10V |
| 2418 | 4822 126 13956 | 68pF 5% 63V |
| 2420 | 4822 122 33753 | 150pF 5% 50V |
| 2501 | 4822 122 33777 | 47pF 5% 63V |
| 2502 | 4822 122 32927 | 220nF 20% 50V |
| 2503 | 4822 122 32927 | 220nF 20% 50V |
| 2504 | 4822 122 32927 | 220nF 20% 50V |
| 2505 | 4822 122 32927 | 220nF 20% 50V |
| 2508 | 4822 124 12095 | 100µF 20% 16V |
| 2546 | 4822 124 23002 | 10µF 16V |
| 2547 | 4822 124 23002 | 10µF 16V |
| 2548 | 4822 124 23002 | 10µF 16V |
| 2549 | 4822 124 23002 | 10µF 16V |
| 2550 | 4822 126 14241 | 330P 50V |
| 2551 | 5322 126 11579 | 3.3nF 10% 63V |
| 2609 | 3198 016 31020 | 0603 25V 1nF |
| 2610 | 4822 126 14238 | 2N2 50V |
| 2611 | 5322 126 11578 | 1nF 10% 50V |
| 2629 | 4822 122 32927 | 220nF 20% 50V |
| 2636 | 4822 122 32927 | 220nF 20% 50V |
| 2637 | 4822 122 32927 | 220nF 20% 50V |
| 2638 | 4822 122 32927 | 220nF 20% 50V |
| 2640 | 4822 126 13879 | 220nF 20% 16V |
| 2641 | 4822 122 32927 | 220nF 20% 50V |
| 2642 | 4822 122 32927 | 220nF 20% 50V |
| 2651 | 4822 126 14305 | 100nF 10% 16V |
| 2652 | 4822 122 33777 | 47pF 5% 63V |
| 2653 | 4822 122 32927 | 220nF 20% 50V |
| 2654 | 4822 126 13881 | 470pF 5% 50V |
| 2655 | 4822 126 13881 | 470pF 5% 50V |
| 2656 | 4822 126 13881 | 470pF 5% 50V |
| 2657 | 4822 126 13881 | 470pF 5% 50V |
| 2658 | 4822 126 13881 | 470pF 5% 50V |
| 2661 | 4822 122 32927 | 220nF 20% 50V |
| 2662 | 4822 122 32927 | 220nF 20% 50V |
| 2663 | 4822 126 13881 | 470pF 5% 50V |
| 2664 | 4822 126 13881 | 470pF 5% 50V |
| 2665 | 4822 124 12095 | 100µF 20% 16V |
| 2666 | 4822 124 12095 | 100µF 20% 16V |
| 2667 | 3198 016 33380 | 3P3 50V |
| 2668 | 3198 016 33380 | 3P3 50V |
| 2669 | 4822 124 23002 | 10µF 16V |
| 2670 | 5322 126 11583 | 10nF 10% 50V |
| 2673 | 3198 016 31020 | 1nF 25V |
| 2674 | 3198 016 31020 | 1nF 25V |
| 2675 | 4822 124 23002 | 10µF 16V |
| 2677 | 3198 030 82280 | 2U2 20% 50V |
| 2677 | 4822 124 23002 | 10µF 16V |
| 2678 | 4822 124 23002 | 10µF 16V |
| 2679 | 4822 126 14305 | 100nF 10% 16V |
| 2680 | 4822 124 23002 | 10µF 16V |
| 2681 | 4822 126 14305 | 100nF 10% 16V |
| 2682 | 4822 124 23002 | 10µF 16V |
| 2685 | 3198 016 31020 | 1nF 25V |
| 2686 | 3198 016 31020 | 1nF 25V |
| 2690 | 4822 126 14305 | 100nF 10% 16V |
| 2691 | 4822 126 14305 | 100nF 10% 16V |
| 2692 | 4822 126 14305 | 100nF 10% 16V |
| 2693 | 4822 126 13883 | 220pF 5% 50V |
| 2702 | 4822 124 23002 | 10µF 16V |
| 2703 | 4822 126 14305 | 100nF 10% 16V |
| 2704 | 4822 124 23002 | 10µF 16V |
| 2706 | 4822 124 12095 | 100µF 20% 16V |
| 2707 | 4822 126 14305 | 100nF 10% 16V |
| 2708 | 4822 124 23002 | 10µF 16V |
| 2709 | 4822 126 14305 | 100nF 10% 16V |
| 2710 | 4822 124 23002 | 10µF 16V |
| 2712 | 4822 124 23002 | 10µF 16V |
| 2713 | 4822 126 14305 | 100nF 10% 16V |
| 2717 | 4822 126 14218 | 3.9pF 50V |
| 2718 | 4822 126 11669 | 27pF |
| 2719 | 4822 126 11663 | 12pF |
| 2720 | 4822 126 14218 | 3.9pF 50V |
| 2721 | 4822 126 11669 | 27pF |
| 2723 | 4822 126 11663 | 12pF |
| 2724 | 4822 126 14218 | 3.9pF 50V |
| 2725 | 4822 126 11669 | 27pF |
| 2726 | 4822 126 11663 | 12pF |
| 2728 | 4822 126 14305 | 100nF 10% 16V |
| 2729 | 4822 126 14225 | 56pF 5% 50V |
| 2730 | 4822 126 14494 | 22nF 10% 25V |
| 2731 | 4822 122 31765 | 100pF 2% 63V |
| 2733 | 4822 126 14494 | 22nF 10% 25V |
| 2738 | 4822 126 14494 | 22nF 10% 25V |
| 2743 | 4822 126 14494 | 22nF 10% 25V |
| 2747 | 4822 126 14507 | 18pF 5% 50V |
| 2748 | 4822 126 14507 | 18pF 5% 50V |
| 2755 | 4822 126 14305 | 100nF 10% 16V |
| 2756 | 4822 126 14305 | 100nF 10% 16V |
| 2757 | 4822 124 23002 | 10µF 16V |
| 2758 | 4822 126 14305 | 100nF 10% 16V |
| 2759 | 4822 126 14305 | 100nF 10% 16V |
| 2760 | 4822 126 14305 | 100nF 10% 16V |
| 2761 | 4822 126 14305 | 100nF 10% 16V |
| 2762 | 4822 126 14305 | 100nF 10% 16V |
| 2763 | 4822 126 14305 | 100nF 10% 16V |
| 2764 | 4822 126 14305 | 100nF 10% 16V |
| 2765 | 4822 126 14305 | 100nF 10% 16V |
| 2766 | 4822 126 14305 | 100nF 10% 16V |
| 2767 | 4822 126 14305 | 100nF 10% 16V |
| 2770 | 4822 126 14305 | 100nF 10% 16V |
| 2771 | 4822 126 14305 | 100nF 10% 16V |
| 2772 | 4822 126 14305 | 100nF 10% 16V |
| 2773 | 4822 126 14305 | 100nF 10% 16V |
| 2774 | 4822 126 14305 | 100nF 10% 16V |
| 2776 | 4822 126 14305 | 100nF 10% 16V |
| 2785 | 4822 126 14305 | 100nF 10% 16V |
| 2786 | 4822 126 14305 | 100nF 10% 16V |
| 2788 | 4822 126 14305 | 100nF 10% 16V |
| 2790 | 4822 126 14305 | 100nF 10% 16V |
| 2792 | 4822 126 14305 | 100nF 10% 16V |
| 2795 | 4822 126 14305 | 100nF 10% 16V |
| 2796 | 4822 126 14305 | 100nF 10% 16V |
| 2797 | 4822 126 13956 | 68pF 5% 63V |
| 2798 | 3198 016 36810 | 680P 25V |
| 2902 | 5322 126 11583 | 10nF 10% 50V |

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|---|---|---|
| 3001 | 4822 051 30472 | 4k7 5% 0.062W |
| 3002 | 4822 051 30472 | 4k7 5% 0.062W |
| 3003 | 4822 051 30223 | 22k 5% 0.062W |
| 3006 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3007 | 4822 117 13521 | 470Ω 5% 0.63W |
| 3008 | 4822 117 13526 | 150Ω 5% 0.63W |
| 3009 | 4822 051 30689 | 68Ω 5% 0.063W |
| 3011 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3012 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3013 | 4822 051 30103 | 10k 5% 0.062W |
| 3014 | 4822 051 30682 | 6k8 5% 0.062W |
| 3015 | 4822 051 30474 | 470k 5% 0.062W |
| 3016 | 4822 051 30152 | 1k5 5% 0.062W |
| 3017 | 4822 051 30472 | 4k7 5% 0.062W |
| 3018 | 4822 051 30103 | 10k 5% 0.062W |
| 3019 | 4822 051 30472 | 4k7 5% 0.062W |
| 3020 | 4822 051 30103 | 10k 5% 0.062W |
| 3021 | 4822 051 30103 | 10k 5% 0.062W |
| 3023 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3024 | 4822 051 30273 | 27k 5% 0.062W |
| 3025 | 4822 051 30221 | 220Ω 5% 0.062W |
| 3026 | 4822 051 30103 | 10k 5% 0.062W |
| 3027 | 4822 117 12925 | 47k 1% 0.063W |
| 3028 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3029 | 4822 051 30103 | 10k 5% 0.062W |
| 3030 | 4822 051 30103 | 10k 5% 0.062W |
| 3031 | 4822 051 30103 | 10k 5% 0.062W |
| 3032 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3033 | 4822 051 30103 | 10k 5% 0.062W |
| 3034 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3035 | 4822 117 13522 | 100Ω 5% 0.63W |
| 3039 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3040 | 4822 051 30103 | 10k 5% 0.062W |
| 3041 | 4822 051 30562 | 5k6 5% 0.063W |
| 3044 | 2120 108 92846 | 4k7 5% |
| 3058 | 4822 051 30682 | 6k8 5% 0.062W |

| | | |
|---|---|---|
| 3059 | 2322 704 66201 | 620Ω 1% |
| 3060 | 4822 051 30103 | 10k 5% 0.062W |
| 3061 | 4822 051 30103 | 10k 5% 0.062W |
| 3062 | 4822 051 30103 | 10k 5% 0.062W |
| 3064 | 4822 117 13522 | 100Ω 5% 0.63W |
| 3073 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3074 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3075 | 4822 051 30103 | 10k 5% 0.062W |
| 3076 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3077 | 4822 051 30272 | 2k7 5% 0.062W |
| 3078 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3079 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3080 | 4822 051 30103 | 10k 5% 0.062W |
| 3081 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3083 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3084 | 4822 051 30103 | 10k 5% 0.062W |
| 3085 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3086 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3087 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3088 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3090 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3091 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3092 | 4822 051 30221 | 220Ω 5% 0.062W |
| 3300 | 2322 750 63908 | 3Ω9 5% |
| 3304 | 2322 750 63908 | 3Ω9 5% |
| 3306 | 4822 051 30221 | 220Ω 5% 0.062W |
| 3307 | 4822 051 30183 | 18k 5% 0.062W |
| 3308 | 4822 051 30684 | 680k 5% 0.062W |
| 3310 | 4822 117 12925 | 47k 1% 0.063W |
| 3311 | 4822 117 13632 | 100k 1% 0.62W |
| 3314 | 4822 051 30103 | 10k 5% 0.062W |
| 3315 | 4822 051 30102 | 1k 5% 0.062W |
| 3316 | 4822 051 30123 | 12k 5% 0.062W |
| 3317 | 4822 051 30221 | 220Ω 5% 0.062W |
| 3318 | 4822 051 30102 | 1k 5% 0.062W |
| 3320 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3321 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3322 | 4822 051 10102 | 1k 2% 0.25W |
| 3324 | 4822 051 30222 | 2k2 5% 0.062W |
| 3327 | 4822 117 13632 | 100k 1% 0.62W |
| 3328 | 4822 051 30393 | 39k 5% 0.062W |
| 3329 | 4822 117 13568 | 6Ω8 5% |
| 3330 | 4822 051 30332 | 3k3 5% 0.062W |
| 3331 | 4822 051 30102 | 1k 5% 0.062W |
| 3333 | 4822 051 30102 | 1k 5% 0.062W |
| 3334 | 4822 051 30102 | 1k 5% 0.062W |
| 3335 | 4822 051 30332 | 3k3 5% 0.062W |
| 3336 | 4822 051 30102 | 1k 5% 0.062W |
| 3337 | 4822 117 12903 | 1k8 1% 0.063W |
| 3338 | 4822 051 30682 | 6k8 5% 0.062W |
| 3340 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3341 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3342 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3343 | 4822 051 30683 | 68k 5% 0.062W |
| 3344 | 4822 051 30222 | 2k2 5% 0.062W |
| 3345 | 4822 051 30103 | 10k 5% 0.062W |
| 3346 | 4822 051 30333 | 33k 5% 0.062W |
| 3347 | 4822 051 30223 | 22k 5% 0.062W |
| 3348 | 4822 051 30222 | 2k2 5% 0.062W |
| 3362 | 4822 051 30103 | 10k 5% 0.062W |
| 3363 | 4822 051 30102 | 1k 5% 0.062W |
| 3364 | 4822 051 30683 | 68k 5% 0.062W |
| 3365 | 4822 051 30472 | 4k7 5% 0.062W |
| 3366 | 4822 051 30102 | 1k 5% 0.062W |
| 3367 | 4822 051 30102 | 1k 5% 0.062W |
| 3370 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3371 | 4822 051 30479 | 47Ω 5% 0.062W |
| 3372 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3376 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3377 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3378 | 4822 051 30153 | 15k 5% 0.062W |
| 3382 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3384 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3385 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3386 | 4822 051 30223 | 22k 5% 0.062W |
| 3388 | 4822 051 30102 | 1k 5% 0.062W |
| 3389 | 4822 117 12925 | 47k 1% 0.063W |
| 3390 | 4822 051 30153 | 15k 5% 0.062W |
| 3391 | 4822 051 30683 | 68k 5% 0.062W |
| 3393 | 4822 117 13632 | 100k 1% 0.62W |
| 3394 | 4822 051 30472 | 4k7 5% 0.062W |
| 3400 | 4822 117 11152 | 4Ω7 5% |
| 3406 | 4822 051 30479 | 47Ω 5% 0.062W |
| 3411 | 4822 051 30472 | 4k7 5% 0.062W |
| 3414 | 4822 051 30472 | 4k7 5% 0.062W |
| 3415 | 4822 117 12902 | 8k2 1% 0.063W |
| 3416 | 4822 117 13568 | 6Ω8 5% |
| 3418 | 4822 051 30391 | 390Ω 5% 0.062W |
| 3419 | 4822 051 30759 | 75Ω 5% 0.062W |
| 3435 | 4822 051 30472 | 4k7 5% 0.062W |
| 3436 | 4822 051 30221 | 220Ω 5% 0.062W |
| 3437 | 4822 051 30102 | 1k 5% 0.062W |
| 3439 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3441 | 4822 051 30393 | 39k 5% 0.062W |
| 3445 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3446 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3532 | 4822 051 30102 | 1k 5% 0.062W |
| 3533 | 4822 051 30103 | 10k 5% 0.062W |
| 3540 | 4822 051 30103 | 10k 5% 0.062W |
| 3550 | 4822 051 30102 | 1k 5% 0.062W |
| 3551 | 4822 051 30102 | 1k 5% 0.062W |
| 3552 | 4822 051 30472 | 4k7 5% 0.062W |
| 3610 | 4822 117 12925 | 47k 1% 0.063W |
| 3611 | 4822 117 12925 | 47k 1% 0.063W |
| 3612 | 4822 117 12925 | 47k 1% 0.063W |
| 3613 | 4822 117 12925 | 47k 1% 0.063W |
| 3614 | 4822 117 12925 | 47k 1% 0.063W |
| 3615 | 4822 117 12925 | 47k 1% 0.063W |
| 3616 | 4822 051 30682 | 6k8 5% 0.062W |
| 3617 | 4822 051 30682 | 6k8 5% 0.062W |
| 3621 | 4822 051 30105 | 1M 5% 0.062W |
| 3636 | 4822 051 30105 | 1M 5% 0.062W |
| 3637 | 4822 051 30105 | 1M 5% 0.062W |
| 3638 | 4822 051 30105 | 1M 5% 0.062W |
| 3642 | 4822 051 30105 | 1M 5% 0.062W |
| 3644 | 4822 051 30105 | 1M 5% 0.062W |
| 3653 | 3198 021 90030 | JUMPER |
| 3654 | 3198 021 90030 | JUMPER |
| 3655 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3656 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3657 | 4822 051 30334 | 330k 5% 0.062W |
| 3658 | 4822 051 30334 | 330k 5% 0.062W |
| 3659 | 4822 051 30334 | 330k 5% 0.062W |
| 3660 | 4822 051 30334 | 330k 5% 0.062W |
| 3661 | 4822 117 11817 | 1k2 1% 1/16W |
| 3662 | 4822 117 11817 | 1k2 1% 1/16W |
| 3663 | 4822 117 11817 | 1k2 1% 1/16W |
| 3665 | 4822 051 30272 | 2k7 5% 0.062W |
| 3673 | 4822 051 30472 | 4k7 5% 0.062W |
| 3676 | 4822 117 11817 | 1k2 1% 1/16W |
| 3677 | 4822 051 30334 | 330k 5% 0.062W |
| 3678 | 4822 117 11817 | 1k2 1% 1/16W |
| 3679 | 4822 051 30334 | 330k 5% 0.062W |
| 3680 | 4822 117 11817 | 1k2 1% 1/16W |
| 3683 | 4822 051 30272 | 2k7 5% 0.062W |
| 3684 | 3198 021 90030 | JUMPER |
| 3685 | 3198 021 90030 | JUMPER |
| 3688 | 3198 021 90030 | JUMPER |
| 3689 | 3198 021 90030 | JUMPER |
| 3702 | 4822 117 12139 | 22Ω 5% 0.062W |
| 3703 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3705 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3706 | 4822 051 30109 | 10Ω 5% 0.062W |
| 3707 | 4822 051 30392 | 3k9 5% 0.063W |
| 3708 | 4822 051 30272 | 2k7 5% 0.062W |
| 3709 | 3198 021 90030 | JUMPER |
| 3710 | 4822 051 30391 | 390Ω 5% 0.062W |
| 3711 | 4822 051 30102 | 1k 5% 0.062W |
| 3712 | 4822 051 30391 | 390Ω 5% 0.062W |
| 3713 | 4822 051 30391 | 390Ω 5% 0.062W |
| 3714 | 4822 117 12139 | 22Ω 5% 0.062W |
| 3716 | 4822 051 30472 | 4k7 5% 0.062W |
| 3717 | 4822 051 30472 | 4k7 5% 0.062W |
| 3718 | 4822 051 30221 | 220Ω 5% 0.062W |
| 3719 | 4822 117 13574 | 1Ω5 5% 1206 |
| 3720 | 4822 117 13574 | 1Ω5 5% 1206 |
| 3721 | 4822 117 13572 | 22Ω 5% 1206 |
| 3722 | 4822 117 13572 | 22Ω 5% 1206 |
| 3725 | 4822 051 30105 | 1M 5% 0.062W |
| 3728 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3731 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3732 | 4822 051 10102 | 1k 2% 0.25W |
| 3733 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3739 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3740 | 3198 021 90030 | JUMPER |
| 3741 | 4822 051 30102 | 1k 5% 0.062W |
| 3744 | 4822 051 30102 | 1k 5% 0.062W |
| 3745 | 4822 051 30102 | 1k 5% 0.062W |
| 3746 | 4822 051 30472 | 4k7 5% 0.062W |
| 3747 | 4822 051 30689 | 68Ω 5% |
| 3748 | 4822 051 30689 | 68Ω 5% |
| 3749 | 4822 051 30689 | 68Ω 5% 0.063W |
| 3754 | 4822 051 30109 | 10Ω 5% 0.062W |
| 3755 | 3198 021 90030 | JUMPER |
| 3757 | 3198 021 90030 | JUMPER |
| 3759 | 3198 021 90030 | JUMPER |
| 3790 | 4822 117 13522 | 100Ω 5% 0.63W |
| 3791 | 4822 117 13522 | 100Ω 5% 0.63W |
| 3792 | 4822 117 13522 | 100Ω 5% 0.63W |
| 3793 | 4822 117 12662 | 10Ω 5% |
| 3793 | 4822 117 13522 | 100Ω 5% 0.63W |
| 3794 | 4822 117 12662 | 10Ω 5% |
| 3794 | 4822 117 13522 | 100Ω 5% 0.63W |
| 3795 | 4822 117 12662 | 10Ω 5% |
| 3795 | 4822 117 13522 | 100Ω 5% 0.63W |
| 3796 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3796 | 4822 051 30109 | 10Ω 5% 0.062W |
| 3797 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3900 | 4822 051 30221 | 220Ω 5% 0.062W |
| 3901 | 4822 051 30221 | 220Ω 5% 0.062W |
| 3903 | 4822 051 30221 | 220Ω 5% 0.062W |
| 3905 | 4822 051 30221 | 220Ω 5% 0.062W |
| 3906 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3907 | 4822 051 30221 | 220Ω 5% 0.062W |
| 3909 | 4822 051 30221 | 220Ω 5% 0.062W |
| 3910 | 4822 051 30221 | 220Ω 5% 0.062W |
| 3911 | 4822 051 30101 | 100Ω 5% 0.062W |

| | | |
|---|---|---|
| 5301 | 4822 157 11876 | 6.8μH 10% |
| 5302 | 4822 157 11876 | 6.8μH 10% |
| 5403 | 2422 549 44461 | IND VAR 40mH |
| 5404 | 2422 535 95427 | 100mH |
| 5405 | 2422 535 95427 | IND FXD 100mHz 120R |
| 5406 | 3198 018 33980 | 3U9 10% |
| 5407 | 3198 018 56880 | 6U8 10% |
| 5408 | 2422 549 44459 | IND VAR 78mH |
| 5409 | 3198 018 51080 | 1U 10% |
| 5410 | 3198 018 33370 | 0U33 10% |
| 5651 | 2422 549 43769 | 100mH |
| 5652 | 2422 549 43769 | 100mH |
| 5653 | 2422 549 43769 | 100mH |
| 5654 | 4822 157 11716 | BLM21P300SPT |
| 5701 | 4822 157 71206 | BLM21A601SPT |
| 5702 | 2422 535 95427 | 100mH |
| 5703 | 4822 157 11716 | BLM21P300SPT |
| 5704 | 4822 157 11716 | BLM21P300SPT |
| 5705 | 2422 535 95427 | 100mH |
| 5706 | 4822 157 11778 | 5U6 10% |
| 5707 | 4822 157 11781 | BLM11A601SPT1 |
| 5708 | 4822 157 11778 | 5U6 10% |
| 5709 | 4822 157 11778 | 5U6 10% |
| 5710 | 4822 157 11778 | 5U6 10% |
| 5711 | 4822 157 11781 | BLM11A601SPT1 |
| 5713 | 4822 157 11781 | BLM11A601SPT1 |
| 5718 | 3198 018 33370 | 0U33 10% |
| 5720 | 4822 157 11781 | BLM11A601SPT1 |
| 5910 | 4822 157 11781 | BLM11A601SPT1 |

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|---|---|---|
| 6001 | 4822 130 11528 | 1PS76SB10 |
| 6003 | 4822 130 11528 | 1PS76SB10 |
| 6303 | 4822 130 11594 | BZX284-C47 |
| 6304 | 4822 130 83757 | BAS216 |
| 6306 | 9322 129 37685 | BZM55-C5V6 |
| 6307 | 4822 130 11528 | 1PS76SB10 |
| 6309 | 4822 130 83757 | BAS216 |
| 6310 | 9322 129 38685 | BZM55-C6V8 |
| 6311 | 9322 149 08685 | BZM55-C22 |
| 6319 | 4822 130 83757 | BAS216 |
| 6334 | 4822 130 83757 | BAS216 |
| 6403 | 4822 130 10414 | BA792 |
| 6652 | 9322 129 40685 | BZM55-C10 |
| 6653 | 4822 130 83757 | BAS216 |

| | | |
|---|---|---|
| 7001 | 9352 629 88557 | SAA5801/011 V30 |
| 7002 | 5322 130 42756 | BC857C |
| 7003 | 3198 010 42310 | BC847BW |
| 7004 | 3198 010 42310 | BC847BW |
| 7005 | 9322 116 74668 | LD1117D33 |
| 7006 | 3104 317 42211 | SOFTW.ASSY<br>310431702211 |
| 7007 | 9322 136 53668 | MSM51V18165D-60JS |
| 7008 | 3198 010 42310 | BC847BW |
| 7009 | 3198 010 42310 | BC847BW |
| 7010 | 5322 130 42756 | BC857C |
| 7011 | 4822 209 17377 | M24C32-WMN6/PROG |
| 7301 | 9352 625 23518 | TDA9330H/N2 |
| 7303 | 5322 130 42756 | BC857C |
| 7308 | 9340 310 30215 | PDTC144ET |
| 7309 | 9340 310 30215 | PDTC144ET |
| 7310 | 9340 310 30215 | PDTC144ET |
| 7311 | 3198 010 42310 | BC847BW |
| 7312 | 3198 010 42310 | BC847BW |
| 7320 | 3198 010 42310 | BC847BW |
| 7322 | 3198 010 42310 | BC847BW |
| 7323 | 9352 625 24518 | TDA9321H/N2 |

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|---|---|---|
| 7324 | 5322 130 63679 | BC847CW |
| 7403 | 4822 130 60511 | BC847B |
| 7407 | 4822 130 60373 | BC856B |
| 7411 | 4822 130 60511 | BC847B |
| 7651 | 9322 143 53671 | MSP3415D-FH-B3 |
| 7651 | 9322 149 63671 | MSP3451G-FH-A1 |
| 7652 | 9351 874 90118 | 74HC4052PW |
| 7656 | 9340 425 20115 | BC847BS |
| 7658 | 9340 425 20115 | BC847BS |
| 7663 | 9340 425 20115 | BC847BS |
| 7674 | 3198 010 42310 | BC847BW |
| 7675 | 9351 874 90118 | 74HC4052PW |
| 7680 | 3198 010 42310 | BC847BW |
| 7681 | 3198 010 42310 | BC847BW |
| 7701 | 5322 130 42756 | BC857C |
| 7702 | 3198 010 42310 | BC847BW |
| 7704 | 4822 209 73852 | PMBT2369 |
| 7708 | 4822 209 90034 | SAA4990H/V0 |
| 7709 | 9352 640 20557 | SAA4978H/V203 |
| 7713 | 9322 116 74668 | LD1117D33 |
| 7714 | 4822 209 17307 | MSM54V12222A-30JS |
| 7715 | 4822 209 17307 | MSM54V12222A-30JS |
| 7716 | 2422 486 80737 | IC SOCKET 32P |
| | 3104 317 42341 | IC SOFTWARE |

## Main Switch Panel [E]

### Various

| | | |
|---|---|---|
| 0151 | 4822 256 91766 | LED HOLDER |
| 0201 | 2422 025 16268 | 2P MALE |
| 0202 | 2422 025 16374 | 2P MALE |
| 0923 | 2412 020 00724 | 2P MALE |
| 0947 | 4822 267 10734 | 5P MALE |
| 1910 | 4822 130 91478 | IR RECEIVER |
| 1951 | 4822 276 14024 | 2P 4/128A |

-||-

| | | |
|---|---|---|
| 2930 | 4822 124 41584 | 100µF 20% 10V |

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| | | |
|---|---|---|
| 3957 | 4822 053 21335 | 3M3 5% 0.5W |
| 3966 | 4822 053 21335 | 3M3 5% 0.5W |
| 3978 | 4822 051 20101 | 100Ω 5% 0.1W |
| 3982 | 4822 117 13577 | 330Ω 1% 1.25W |

-▶|-

| | | |
|---|---|---|
| 6901 | 4822 130 10859 | TLDR5400 |

## CRT Panel [F]

### Various

| | | |
|---|---|---|
| 0298 | 2422 500 80052 | 9P FEMALE |
| 0340 | 3104 311 02321 | CABLE 11P 400mm |
| 0383 | 2422 025 16382 | 3P MALE |

-||-

| | | |
|---|---|---|
| 2300 | 4822 124 40764 | 22µF 100 V |
| 2301 | 4822 124 40196 | 220µF 20% 16V |
| 2302 | 5322 122 32286 | 3.3pF 5% 50V |
| 2303 | 5322 122 32268 | 470pF 10% 50V |
| 2304 | 4822 121 41856 | 22nF 5% 250V |
| 2305 | 4822 124 41751 | 47µF 20% 50V |
| 2306 | 4822 126 14585 | 100nF 10% 50V |
| 2307 | 5322 122 32654 | 22nF 10% 63V |
| 2308 | 4822 126 13486 | 15pF 2% 63V |
| 2309 | 5322 122 32654 | 22nF 10% 63V |
| 2310 | 4822 126 13689 | 18pF 1% 63V |
| 2312 | 5322 122 32658 | 22pF 5% 50V |
| 2313 | 4822 124 11565 | 10µF 20% 250V |
| 2316 | 4822 121 40518 | 100nF 10% 250V |
| 2317 | 5322 121 44356 | 4.7nF 5% 2KV |
| 2318 | 5322 122 32654 | 22nF 10% 63V |
| 2320 | 4822 126 13838 | 100nF 20% 50V |
| 2321 | 5322 122 32531 | 100pF 5% 50V |
| 2322 | 5322 122 32531 | 100pF 5% 50V |
| 2323 | 5322 122 32531 | 100pF 5% 50V |
| 2325 | 4822 126 14585 | 100nF 10% 50V |

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| | | |
|---|---|---|
| 3300 | 4822 052 10109 | 10Ω 5% 0.33W |
| 3301 | 4822 053 12103 | 10k 5% 3W |
| 3302 | 4822 051 20182 | 1k8 5% 0.1W |
| 3303 | 4822 117 10965 | 18k 1% 0.1W |
| 3304 | 4822 117 11454 | 820Ω 1% 0.1W |
| 3305 | 4822 117 13577 | 330Ω 1% 1.25W |
| 3306 | 4822 051 20478 | 4Ω7 5% 0.1W |
| 3307 | 4822 051 20109 | 10Ω 5% 0.1W |
| 3308 | 4822 117 11148 | 56k 1% 0.1W |
| 3309 | 4822 117 10353 | 150Ω 1% 0.1W |
| 3310 | 4822 051 10102 | 1k 2% 0.25W |
| 3311 | 4822 051 20101 | 100Ω 5% 0.1W |
| 3312 | 4822 117 11449 | 2k2 1% 0.1W |
| 3313 | 4822 116 83872 | 220Ω 5% 0.5W |
| 3314 | 4822 116 83872 | 220Ω 5% 0.5W |
| 3315 | 4822 117 11139 | 1k5 1% 0.1W |
| 3316 | 4822 117 11148 | 56k 1% 0.1W |
| 3317 | 4822 051 20122 | 1k2 5% 0.1W |
| 3318 | 4822 051 20159 | 15Ω 5% 0.1W |
| 3319 | 4822 117 11454 | 820Ω 1% 0.1W |
| 3320 | 4822 051 10102 | 1k 2% 0.25W |
| 3334 | 4822 050 11002 | 1k 1% 0.4W |
| 3335 | 4822 051 10102 | 1k 2% 0.25W |
| 3336 | 4822 051 10102 | 1k 2% 0.25W |
| 3337 | 4822 051 10102 | 1k 2% 0.25W |
| 3338 | 3198 013 01020 | 1k 2% 1/2W |
| 3339 | 3198 013 01020 | 1k 2% 1/2W |
| 3340 | 3198 013 01020 | 1k 2% 1/2W |
| 3341 | 4822 052 10151 | 150Ω 5% 0.33W |
| 3342 | 4822 051 20471 | 470Ω 5% 0.1W |
| 3344 | 4822 116 52191 | 33Ω 5% 0.5W |
| 3345 | 4822 116 52191 | 33Ω 5% 0.5W |
| 3347 | 3198 013 01520 | 1k5 2% 1/2W |
| 3348 | 4822 050 11204 | 120k 1% 0.4W |
| 3349 | 3198 013 01020 | 1k 2% 1/2W |
| 3350 | 4822 116 83883 | 470Ω 5% 0.5W |
| 3351 | 4822 116 83883 | 470Ω 5% 0.5W |
| 3352 | 4822 116 83883 | 470Ω 5% 0.5W |
| 3354 | 4822 117 11449 | 2k2 1% 0.1W |
| 3355 | 4822 051 20478 | 4Ω7 5% 0.1W |
| 3356 | 4822 051 10102 | 1k 2% 0.25W |
| 3357 | 4822 051 20478 | 4Ω7 5% 0.1W |
| 4xxx | 4822 051 10008 | 0Ω 5% 0.25W |
| 4xxx | 4822 051 20008 | 0Ω 5% 0.25W |

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| | | |
|---|---|---|
| 5300 | 2422 531 98035 | TFM S13974-01 Y |

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| | | |
|---|---|---|
| 6305 | 4822 130 30842 | BAV21 |
| 6306 | 4822 130 30842 | BAV21 |
| 6307 | 4822 130 30842 | BAV21 |
| 6310 | 4822 130 83757 | BAS216 |

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| | | |
|---|---|---|
| 7300 | 4822 130 44154 | BF199 |
| 7301 | 4822 130 42589 | BF370 |
| 7302 | 5322 130 41888 | BD140-16 |
| 7303 | 5322 130 41886 | BD139-16 |
| 7307 | 9352 561 40112 | TDA6108 |
| 8317 | 3104 311 01901 | CABLE 2P 560mm |
| 8325 | 3104 311 01911 | CABLE 3P 680mm |

## Side I/O Panel [O]

### Various

| | | |
|---|---|---|
| 0900 | 2422 026 04926 | 4P FEMALE |
| 0901 | 4822 267 10975 | 3P |
| 0902 | 4822 267 31014 | HEADPHONE SOCKET |
| 0936 | 2422 025 12485 | 11P MALE |

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| | | |
|---|---|---|
| 2905 | 4822 122 33177 | 10nF 20% 50V |
| 2906 | 4822 122 33177 | 10nF 20% 50V |

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| | | |
|---|---|---|
| 3901 | 4822 051 20101 | 100Ω 5% 0.1W |
| 3902 | 4822 116 52201 | 75Ω 5% 0.5W |
| 3903 | 4822 051 20101 | 100Ω 5% 0.1W |
| 3904 | 4822 116 52201 | 75Ω 5% 0.5W |
| 3905 | 4822 050 11002 | 1k 1% 0.4W |
| 3906 | 4822 050 11002 | 1k 1% 0.4W |
| 3907 | 4822 117 10834 | 47k 1% 0.1W |
| 3908 | 4822 050 11002 | 1k 1% 0.4W |
| 3909 | 4822 117 10834 | 47k 1% 0.1W |
| 3910 | 4822 116 52276 | 3k9 5% 0.5W |
| 3911 | 4822 050 21003 | 10k 1% 0.6W |
| 3912 | 4822 050 21003 | 10k 1% 0.6W |

## Top Control Panel [P]

### Various

| | | |
|---|---|---|
| 0345 | 4822 267 10748 | 3P MALE |
| 1701 | 4822 276 13775 | SWITCH |
| 1702 | 4822 276 13775 | SWITCH |
| 1703 | 4822 276 13775 | SWITCH |
| 1704 | 4822 276 13775 | SWITCH |
| 1705 | 4822 276 13775 | SWITCH |

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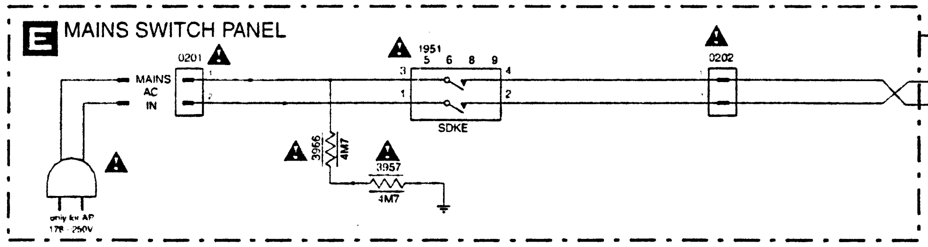
| | | |
|---|---|---|
| 3701 | 4822 051 20391 | 390Ω 5% 0.1W |
| 3702 | 4822 117 13528 | 200Ω 1% 0.125W |
| 3703 | 4822 117 10845 | 620Ω 1% 0.1W |
| 3704 | 4822 117 11534 | 1k1 1% 0.1W |
| 3705 | 4822 117 11951 | 2k 1% 0.1W |
| 3999 | 4822 051 10102 | 1k 2% 0.25W |

# A LSP (Large Signal Panel)

| Error | Device | Description | Defective item | Diagram | Defect. module indication |
|---|---|---|---|---|---|
| 1 | 29" | NVM | 7011 | B5 | Control |
| 2 | 1N | HFB | | | Horizontal Flyback |
| 3 | 560N | PICNIC | 7709 | B3 | Feature Box |
| 4 | - | 5V2 | | | +5V Supply |
| 5 | 10N | 8V6 | | | +8V Supply |
| 6 | 22N | | | | Slow I²C blocked |
| 7 | 6N8 | HOP video control/geometry | 7301 | B4 | Video Controller |
| 8 | 560N | HIP I/O-video processing | 7323 | B2 | Chroma IF IO |
| 9 | - | | | A3 | |
| 10 | 1N | | | | |
| 11 | 3W 15R | | | | |
| 12 | 100R | TUNER_PROT | | | +8V (Tuner) Supply |
| 13 | 6K8 | Tuner | U1200 | A7 | Tuner |
| 14 | - | ITT sound processor + Dolby | 7651 | B6 | Audio Module |
| 15 | 22K | | | | |
| 16 | FUSE 8R2 | FBX_PROT | | | |

## Error Code Table

Error messages



E MAINS SWITCH PANEL

0201
MAINS
AC
IN
1951
SDKE
0202
3966
4M7
3957
4M7
only for AP
170 - 250V

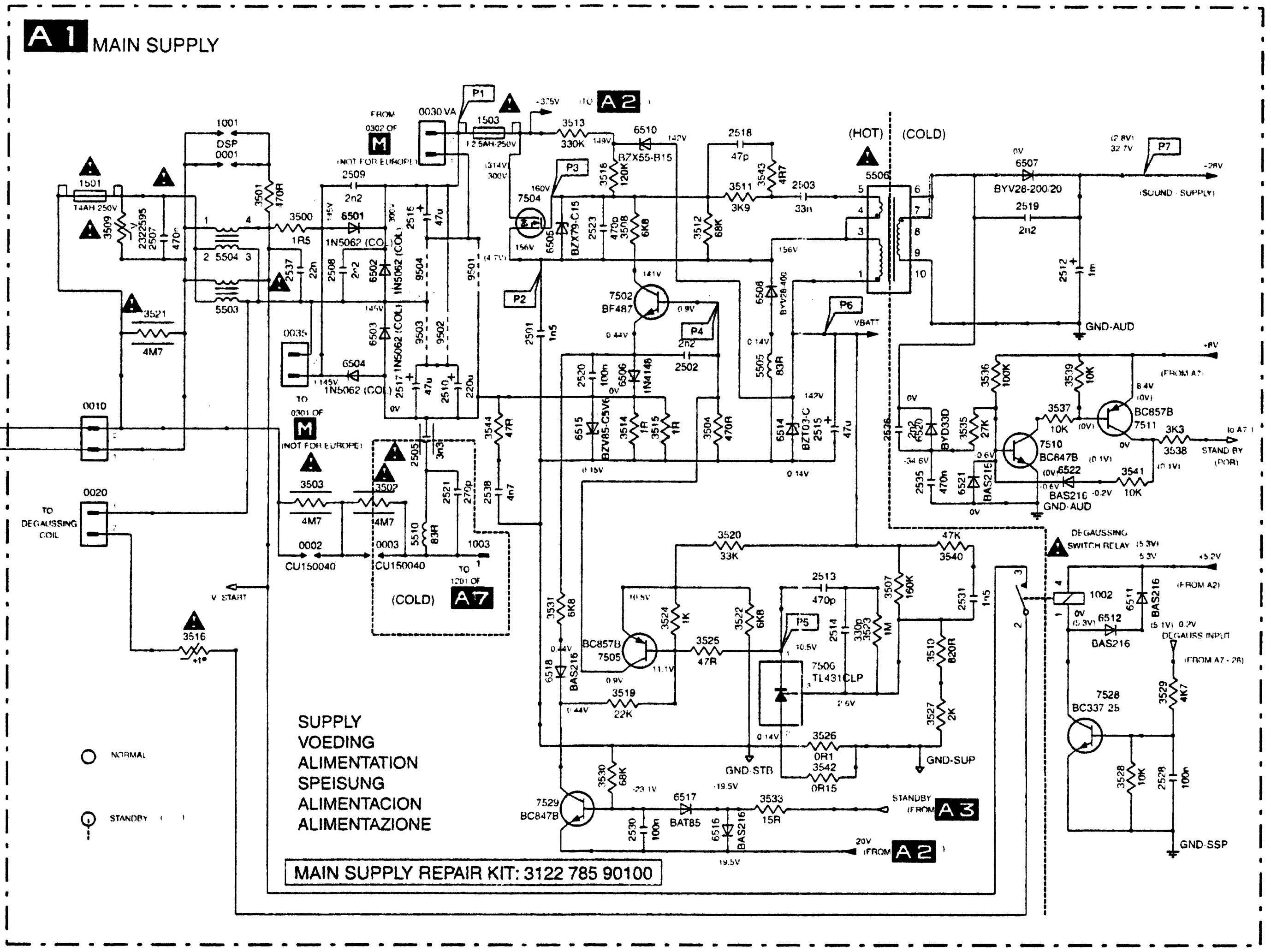
## Diversity Tables

| Diversity Large Signal Panel (A1) | | | | | |
|---|---|---|---|---|---|
| PosNr | 29" | 25" | 28" | 28" WS | 32" WS |
| 8000 | CBLE DIP 2P/340mm | CBLE HR 3P/340mm | CBLE HR 3P/340mm | CBLE DIP 2P/340mm | CBLE DIP 2P/340mm |

| Diversity Large Signal Panel (A3) | | | | | |
|---|---|---|---|---|---|
| PosNr | 29" | 25" | 28" | 28" WS | 32" WS |
| 2420 | 1N | 1N | 1N | 560P | 1N |
| 2421 | 560N | 560N | 470N | - | - |
| 2422 | - | - | - | 21U2 | 21U2 |
| 2425 | 10N | 9N1 | - | 11N | 11N |
| 2426 | 22N | 24N | 24N | 24N | 24N |
| 2431 | 6N8 | 3N3 | 3N3 | 3N3 | 3N3 |
| 2433 | 560N | 390N | 470N | 390N | 430N |
| 2435 | - | - | 9N1 | - | - |
| 2455 | 1N | - | - | 3N3 | 3N3 |
| 3415 | 3W 15R | 3W 15R | 3W 15R | PR03 12R | PR03 12R |
| 3431 | 100R | 220R | 220R | 220R | 220R |
| 3450 | 6K8 | - | - | 10K | 10K |
| 3450 | - | 8K2 | 8K2 | - | - |
| 3451 | 22K | 22K | 22K | 10K | 10K |
| 3466 | FUSE 8R2 | 6R8 | FUSE 8R2 | 1R | 1R |
| 3488 | 330K | 220K | 220K | 220K | 120K |
| 5421 | COI LINCOR DRUM | COI LINCOR DC12 8MH | COI LINCOR DRUM | COI LINCOR DRUM | COI LINCOR DRUM |
| 5422 | COI BRIDGE | - | - | COI BRIDGE | COI BRIDGE |
| 5424 | - | COI BRIDGE | COI BRIDGE | - | - |
| 5430 | LOT 30KV ISO ELDOR | LOT PWRSL. 27K5 | LOT PWRSL. 27K5 | LOT PWRSL. 30KV | LOT PWRSL. 30KV |
| 2445 | - | - | - | - | 1U |
| 2446 | - | - | - | - | 470P |
| 2447 | - | - | - | - | 470P |
| 3439 | - | - | - | - | 100R |
| 3440 | - | - | - | - | 22K |
| 3441 | - | - | - | - | 470K |
| 3442 | - | - | - | - | 470K |
| 3443 | - | - | - | - | 100R |
| 3444 | - | - | - | - | 39K |
| 3445 | - | - | - | - | 2K2 |
| 3446 | - | - | - | - | 2K2 |
| 3447 | - | - | - | - | 22R |
| 4441 | - | - | - | - | JUMP |
| 6440 | - | - | - | - | SMAS216 |
| 6441 | - | - | - | - | SMAS216 |

| Diversity Large Signal Panel (A4) | | | | | |
|---|---|---|---|---|---|
| PosNr | 29" | 25" | 28" | 28" WS | 32" WS |
| 0390 | - | - | - | - | CON 03P |
| 3602 | 3K3 | 3K3 | 3K3 | - | - |
| 3611 | - | - | - | 8K2 | 8K2 |
| 3614 | 1M | 1M | 1M | 1M2 | 1M2 |
| 3615 | 470K | 560K | 560K | 560K | 560K |
| 3621 | 1R | 1R5 | 1R5 | 1R5 | 1R5 |
| 3622 | 1R | 1R | 1R | 1R8 | 1R8 |
| 6600 | 1N4148 | 1N4148 | 1N4148 | SIGAT85 | SIGAT85 |
| 6621 | ECYD33D | - | - | ECYD33D | ECYD33D |
| 6622 | DIO | - | - | DIO | DIO |
| 7440 | - | - | - | - | LM358N |
| 7441 | - | - | - | - | SIGC547B |
| 7442 | - | - | - | - | SIGC557B |
| 9622 | - | WR | WR | - | - |

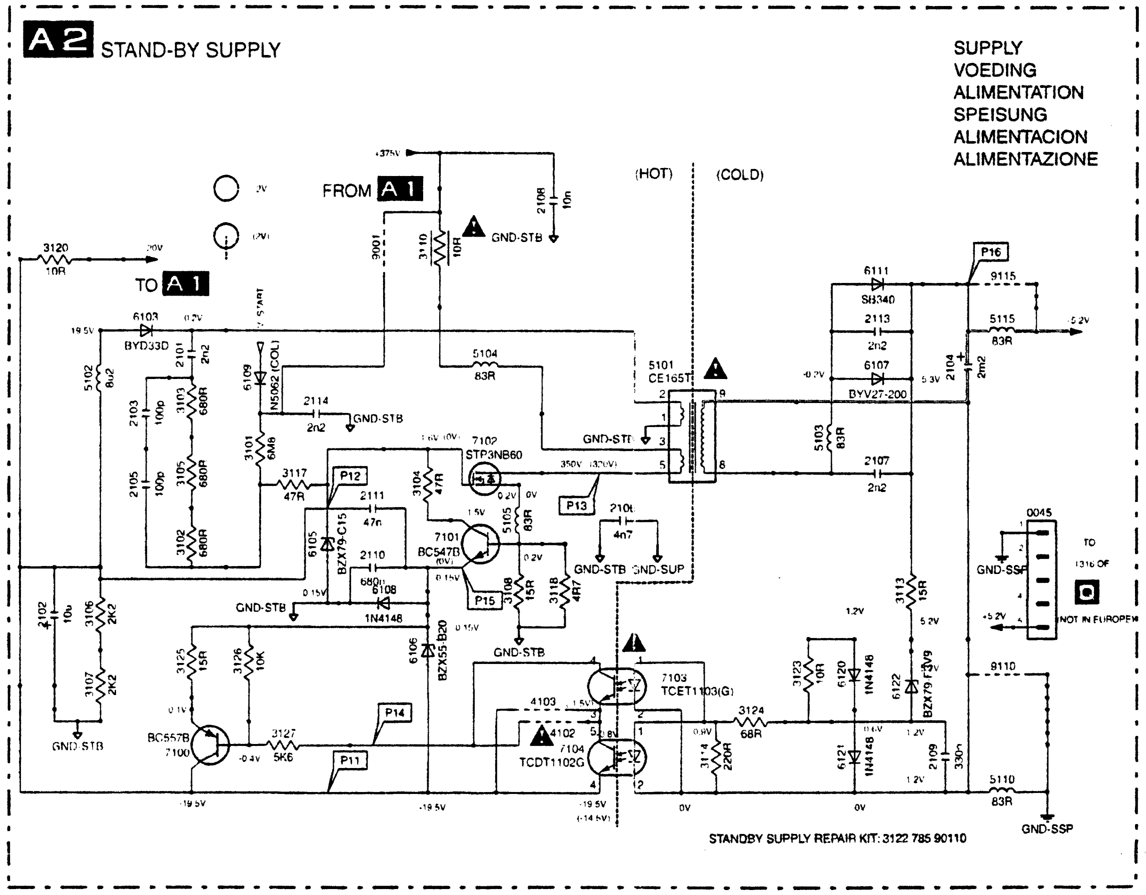
| Diversity Small Signal Panel (B6) | | | |
|---|---|---|---|
| Item | 100HZ INCR ST | DS VIRT DLB | 100HZ DLB |
| 2636 | 220N | - | - |
| 2638 | 220N | - | - |
| 2641 | 220N | - | - |
| 2642 | 220N | - | - |
| 2663 | - | 470P | 470P |
| 2664 | - | 470P | 470P |
| 2677 | 2U2 | 10U | 10U |
| 2678 | - | 10U | 10U |
| 2678 | - | 10U | 10U |
| 2685 | - | 1N | 1N |
| 2686 | - | 1N | 1N |
| 2692 | 100N | - | - |
| 3552 | 4K7 | - | - |
| 3617 | 6K8 | - | - |
| 3636 | 1M | - | - |
| 3638 | 1M | - | - |
| 3642 | 1M | - | - |
| 3644 | 1M | - | - |
| 3657 | 330K | - | - |
| 3659 | 330K | - | - |
| 3661 | 1K2 | - | - |
| 3663 | 1K2 | - | - |
| 3665 | 2K7 | - | - |
| 3676 | 1K2 | - | - |
| 3677 | 330K | - | - |
| 3678 | 1K2 | - | - |
| 3679 | 330K | - | - |
| 4605 | - | JUMP | JUMP |
| 4606 | - | JUMP | JUMP |
| 4613 | - | JUMP | JUMP |
| 4615 | - | JUMP | JUMP |
| 4620 | - | JUMP | JUMP |
| 4621 | - | JUMP | JUMP |
| 4630 | JUMP | - | - |
| 4631 | JUMP | - | - |
| 4632 | - | JUMP | JUMP |
| 4633 | - | JUMP | JUMP |
| 4634 | - | JUMP | JUMP |
| 4635 | - | JUMP | JUMP |
| 4650 | - | JUMP | JUMP |
| 4651 | - | JUMP | JUMP |
| 4678 | - | JUMP | JUMP |
| 4679 | - | JUMP | JUMP |
| 4680 | JUMP | - | - |
| 4681 | JUMP | - | - |
| 7651 | MSP3415D-FH-B3 | MSP3451G-FH-A1 | MSP3451G-FH-A1 |
| 7658 | BC847BS | - | - |
| 7663 | BC847BS | - | - |
| 7675 | 74HC4052PW | - | - |
| 7681 | BC847BW | - | - |



A1 MAIN SUPPLY

SUPPLY
VOEDING
ALIMENTATION
SPEISUNG
ALIMENTACION
ALIMENTAZIONE
(HOT)
(COLD)
A2
A3
A7
1501
1001
DSP
5504
5503
7504
7502
BF487
7505
BC857B
7506
TL431CLP
7529
BC847B
7510
BC847B
7511
BC857B
7528
BC337 25
5506
BYV28-200/20
(SOUND SUPPLY)
GND-AUD
GND-SUP
GND-STB
GND-SSP
TO DEGAUSSING COIL
DEGAUSSING SWITCH RELAY
STANDBY
NORMAL
(NOT FOR EUROPE)

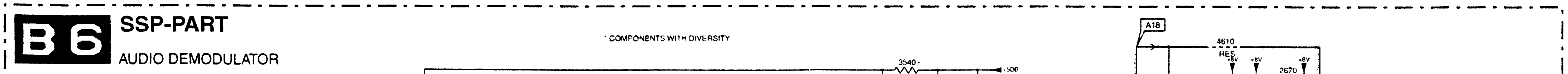
MAIN SUPPLY REPAIR KIT: 3122 785 90100



A2 STAND-BY SUPPLY

SUPPLY
VOEDING
ALIMENTATION
SPEISUNG
ALIMENTACION
ALIMENTAZIONE
FROM A1
TO A1
(HOT)
(COLD)
5101
CE165T
7102
STP3NB60
7101
BC547B
7100
BC557B
7103
TCET1103(G)
7104
TCDT1102G
GND-STB
GND-SUP
GND-SSP
0045
NOT IN EUROPE

STANDBY SUPPLY REPAIR KIT: 3122 785 90110

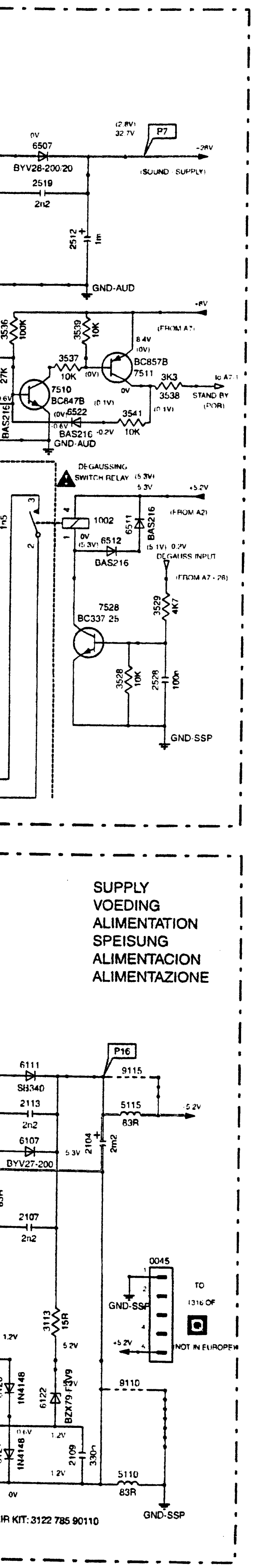


B6 SSP-PART

AUDIO DEMODULATOR

* COMPONENTS WITH DIVERSITY

3540
A18
4610
RES



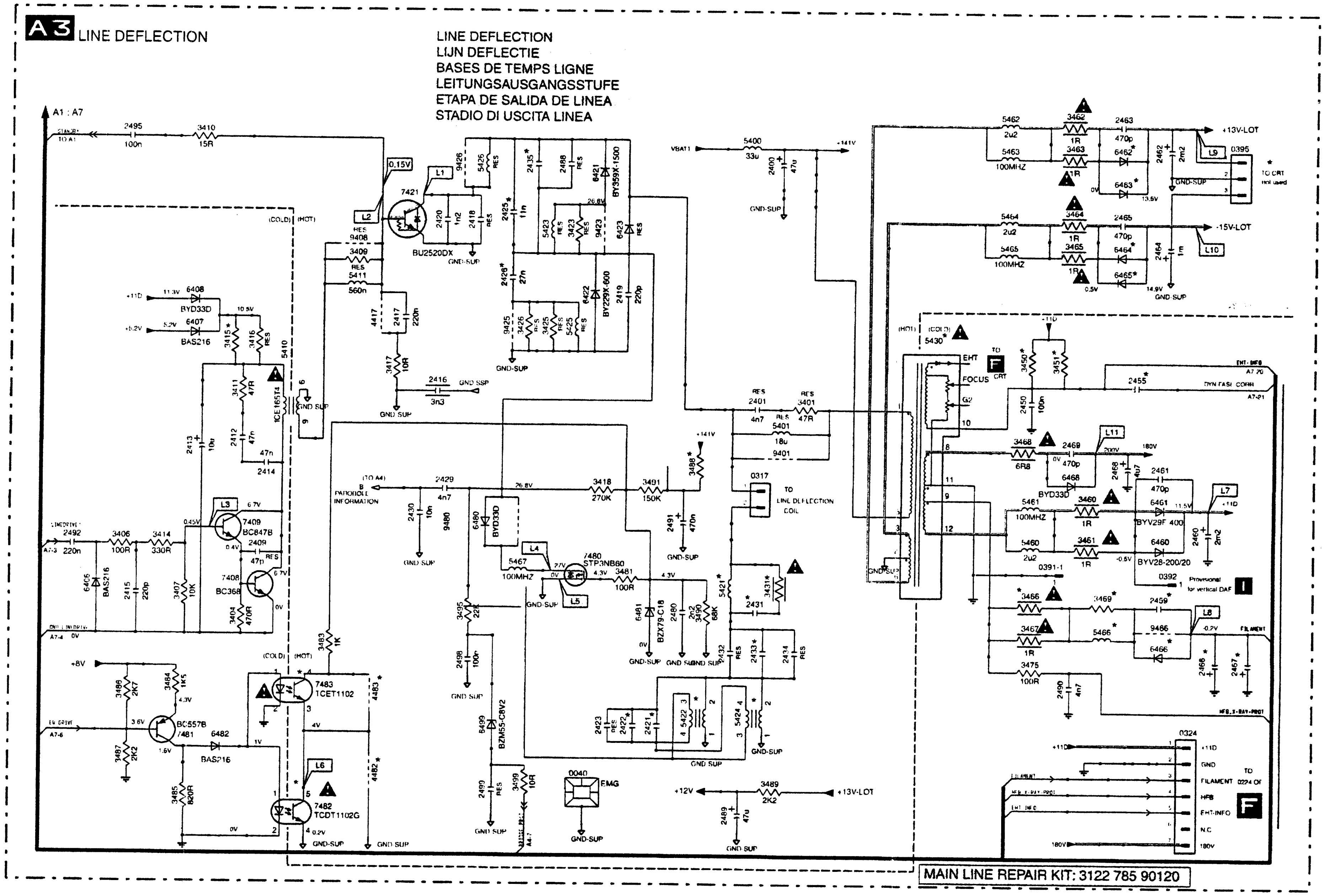
BYV28-200/20
(SOUND SUPPLY)
GND-AUD
BC847B
BC857B
BAS216
DEGAUSSING SWITCH RELAY
DEGAUSS INPUT
BC337-25
GND-SSP
SB340
BYV27-200
1N4148
BZX79-C9V1
NOT IN EUROPE
GND-SSP

SUPPLY
VOEDING
ALIMENTATION
SPEISUNG
ALIMENTACION
ALIMENTAZIONE

R KIT: 3122 785 90110

## A3 LINE DEFLECTION

LINE DEFLECTION
LIJN DEFLECTIE
BASES DE TEMPS LIGNE
LEITUNGSAUSGANGSSTUFE
ETAPA DE SALIDA DE LINEA
STADIO DI USCITA LINEA

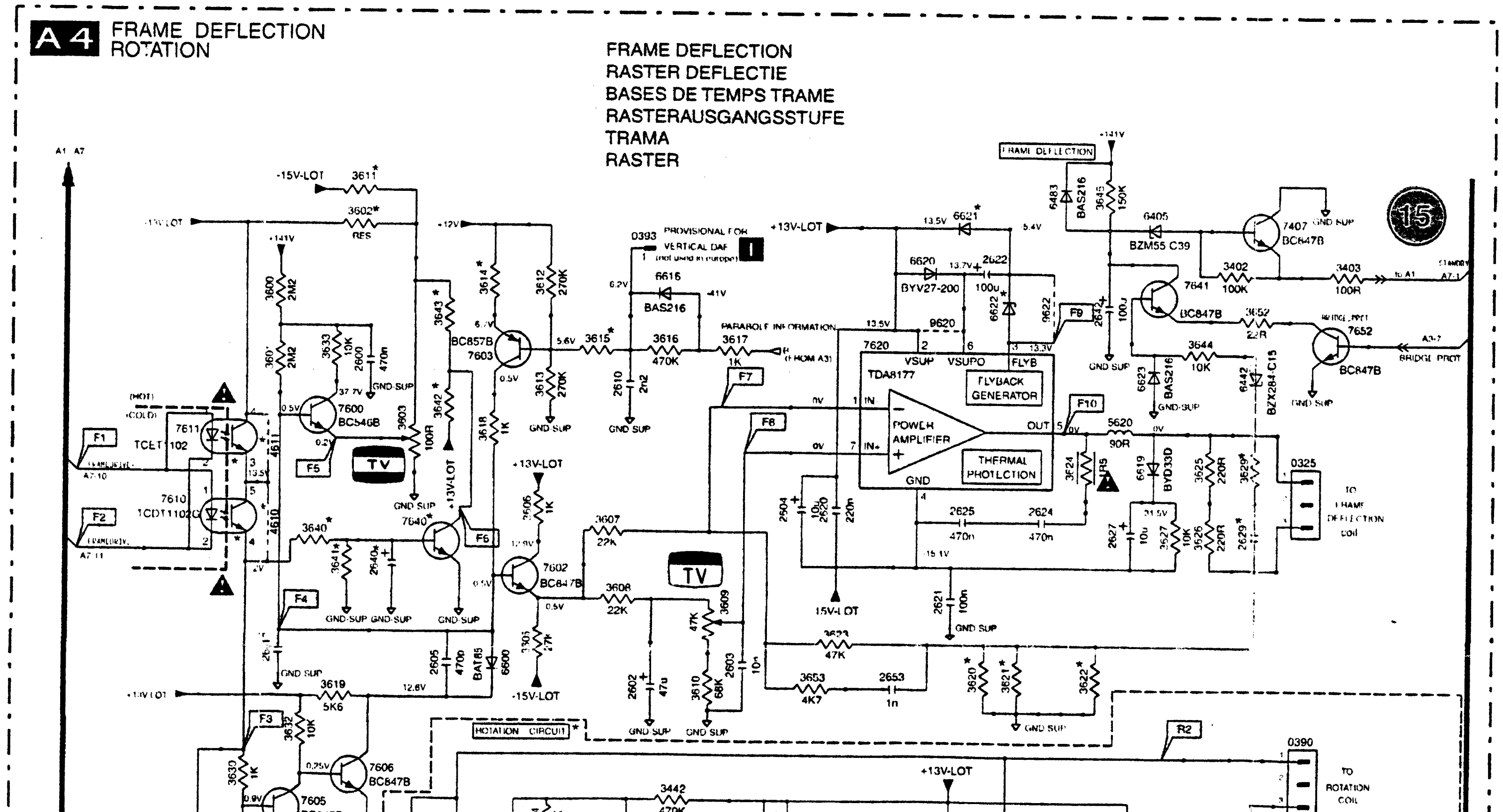


18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
A1 : A7
BU2520DX
BY359X-1500
BY229X-600
BYD33D
BAS216
BC847B
BC368
BC557B
STP3NB60
BZX79-C18
BZM55-C8V2
1CET1102
TCDT1102G
VBAT1
GND-SUP
EHT
FOCUS
G2
TO CRT
PARABOLE INFORMATION
TO LINE DEFLECTION COIL
+13V-LOT
-15V-LOT
BYV29F-400
BYV28-200/20
Provisional for vertical DAF
DYN FASE CORR
FILAMENT
HFB
EHT-INFO
TO FILAMENT 0224 OF
EMG
+12V
(COLD) (HOT)

MAIN LINE REPAIR KIT: 3122 785 90120

## A4 FRAME DEFLECTION ROTATION

FRAME DEFLECTION
RASTER DEFLECTIE
BASES DE TEMPS TRAME
RASTERAUSGANGSSTUFE
TRAMA
RASTER



A1 : A7
-15V-LOT
+13V-LOT
BC857B
BC546B
BC847B
TCET1102
TCDT1102G
TV
TDA8177
VSUP
VSUPO
FLYB
FLYBACK GENERATOR
POWER AMPLIFIER
THERMAL PROTECTION
GND
OUT
IN-
IN+
PROVISIONAL FOR VERTICAL DAF
PARABOLE INFORMATION
FRAME DEFLECTION
BZM55 C39
BYV27-200
BAS216
BYD33D
BZX284-C15
BRIDGE PROT
TO FRAME DEFLECTION COIL
TO ROTATION COIL
ROTATION CIRCUIT
15

AFTER 5 TIMES OF STANDBY TO PROTECTION

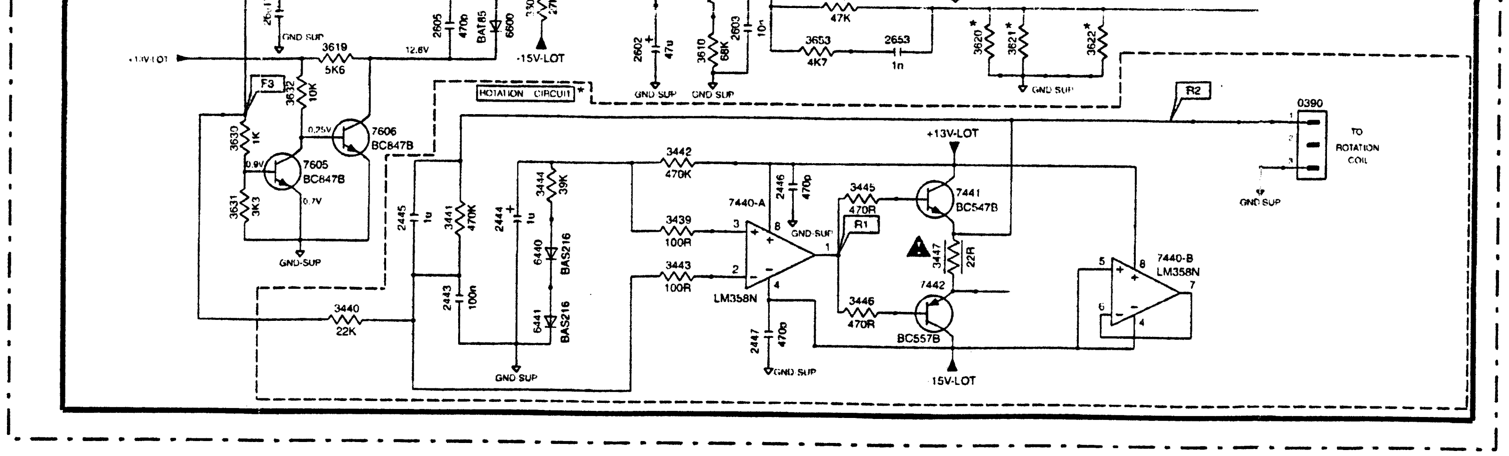
— SUPPLY

● PROTECTION ERROR

○ NON-PROTECTION ERROR

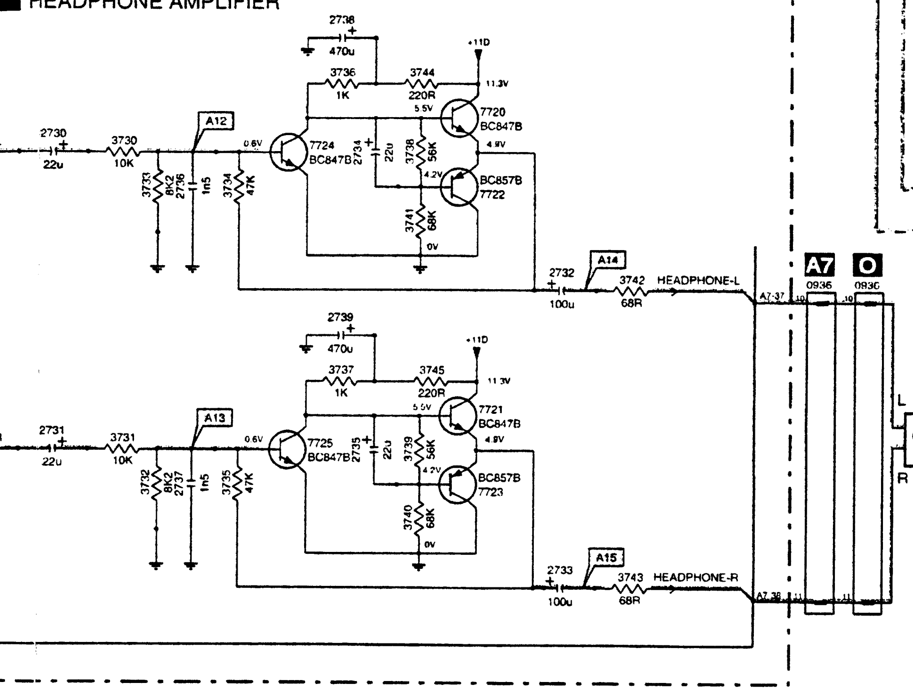
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0001 | B3 | 3107 | L13 | 3739 | S20 | 7733 | U26 | | |
| 0002 | D13 | 3108 | K16 | 3740 | T20 | 7740 | U28 | | |
| 0003 | D14 | 3110 | I15 | 3741 | R20 | 7750 | Q28 | | |
| 0010 | C12 | 3113 | K18 | 3742 | R21 | 9001 | I15 | | |
| 0020 | D12 | 3114 | L17 | 3743 | T21 | 9110 | L19 | | |
| 0030 | B14 | 3117 | J14 | 3744 | Q20 | 9401 | E28 | | |
| 0035 | C13 | 3120 | I13 | 3745 | S20 | 9408 | C24 | | |
| 0045 | K19 | 3118 | K16 | 3752 | Q26 | 9423 | C26 | | |
| 0041 | Q27 | 3125 | L14 | 3753 | R26 | 9425 | D26 | | |
| 0201 | D6 | 3126 | L14 | 3754 | R25 | 9501 | B14 | | |
| 0202 | D12 | 3123 | L18 | 3756 | T27 | 9502 | C14 | | |
| 0325 | L29 | 3124 | L17 | 3757 | R30 | 9503 | C14 | | |
| 0393 | J25 | 3127 | L14 | 3758 | R30 | 9504 | B14 | | |
| 0390 | M29 | 3406 | F22 | 3762 | R31 | 9620 | K27 | | |
| 0680 | M1 | 3407 | F23 | 3763 | W30 | | | | |
| 0681 | P1 | 3402 | J29 | 3764 | W30 | | | | |
| 0682 | U7 | 3409 | C24 | 3765 | S29 | | | | |
| 0735 | R32 | 3410 | B23 | 3770 | T25 | | | | |
| 0736 | Q32 | 3403 | J30 | 3773 | T25 | | | | |
| 0737 | U32 | 3411 | D23 | 3781 | W30 | | | | |
| 0738 | V32 | 3414 | F23 | 3784 | U30 | | | | |
| 0739 | S32 | 3426 | D26 | 3790 | Q27 | | | | |
| 1001 | B13 | 3431 | F28 | 3794 | V23 | | | | |
| 1003 | D15 | 3440 | O23 | 3795 | W23 | | | | |
| 1002 | E19 | 3439 | N25 | 3792 | R27 | | | | |
| 1501 | B12 | 3441 | N24 | 3789 | Q31 | | | | |
| 1503 | B15 | 3442 | N25 | 3796 | V27 | | | | |
| 1651 | T9 | 3443 | N25 | 3798 | U27 | | | | |
| 2101 | J14 | 3444 | N25 | 3957 | D8 | | | | |
| 2102 | K13 | 3445 | N27 | 3966 | D7 | | | | |
| 2103 | J14 | 3446 | O27 | 4102 | L16 | | | | |
| 2105 | J14 | 3447 | N27 | 4103 | L16 | | | | |
| 2104 | J19 | 3450 | D30 | 4417 | D24 | | | | |
| 2106 | K17 | 3451 | D30 | 4482 | H24 | | | | |
| 2108 | I16 | 3460 | E31 | 4483 | G24 | | | | |
| 2107 | J18 | 3461 | F31 | 4605 | W3 | | | | |
| 2110 | K15 | 3468 | E30 | 4606 | T3 | | | | |
| 2111 | K15 | 3469 | F31 | 4604 | W9 | | | | |
| 2109 | L19 | 3475 | G30 | 4607 | U6 | | | | |
| 2114 | J15 | 3484 | G23 | 4608 | U6 | | | | |
| 2113 | I18 | 3483 | G24 | 4609 | U6 | | | | |
| 2400 | B28 | 3481 | F27 | 4612 | M5 | | | | |
| 2401 | D28 | 3500 | B13 | 4610 | N12 | | | | |
| 2409 | F23 | 3501 | B13 | 4613 | M13 | | | | |
| 2412 | E23 | 3502 | D14 | 4614 | O12 | | | | |
| 2413 | E23 | 3503 | D13 | 4615 | R13 | | | | |
| 2414 | E24 | 3491 | E27 | 4610 | L23 | | | | |
| 2421 | G27 | 3504 | C16 | 4611 | L23 | | | | |
| 2422 | G27 | 3495 | F25 | 4620 | U14 | | | | |
| 2423 | G26 | 3509 | B12 | 4621 | W13 | | | | |
| 2425 | C26 | 3508 | B15 | 4634 | T3 | | | | |
| 2426 | C26 | 3507 | E17 | 4630 | T8 | | | | |
| 2429 | E25 | 3499 | H26 | 4635 | T3 | | | | |
| 2443 | O24 | 3511 | B16 | 4631 | T8 | | | | |
| 2444 | N24 | 3510 | E18 | 4632 | R10 | | | | |
| 2445 | N24 | 3512 | B16 | 4633 | S10 | | | | |
| 2446 | N26 | 3513 | B15 | 4652 | P1 | | | | |
| 2447 | O26 | 3514 | C15 | 4654 | R2 | | | | |
| 2450 | D30 | 3516 | E13 | 4650 | U13 | | | | |
| 2455 | D31 | 3515 | C16 | 4651 | W13 | | | | |
| 2459 | F31 | 3518 | B15 | 4653 | S14 | | | | |
| 2460 | E32 | 3521 | C12 | 4676 | W12 | | | | |
| 2461 | E31 | 3519 | E15 | 4677 | W12 | | | | |
| 2462 | B31 | 3520 | D16 | 4682 | U7 | | | | |
| 2469 | E31 | 3522 | E16 | 4678 | R12 | | | | |
| 2502 | S2 | 3523 | E17 | 4683 | U7 | | | | |
| 2503 | R2 | 3524 | E16 | 4679 | R12 | | | | |
| 2501 | Q5 | 3525 | E16 | 4684 | U7 | | | | |
| 2504 | W2 | 3532 | N9 | 4685 | W7 | | | | |
| 2480 | F27 | 3533 | N8 | 4680 | R13 | | | | |
| 2505 | T2 | 3526 | F17 | 4686 | W7 | | | | |
| 2506 | Q2 | 3527 | E18 | 4687 | W7 | | | | |
| 2507 | Q2 | 3530 | F15 | 4681 | R14 | | | | |
| 2488 | B26 | 3531 | E15 | 4707 | R31 | | | | |
| 2501 | C15 | 3528 | F19 | 4708 | R31 | | | | |
| 2489 | H28 | 3529 | E19 | 4709 | S32 | | | | |
| 2508 | O9 | 3533 | F16 | 4710 | S32 | | | | |
| 2502 | C16 | 3540 | N9 | 4722 | U25 | | | | |
| 2491 | E27 | 3535 | C18 | 4736 | V24 | | | | |
| 2505 | D14 | 3550 | O3 | 4737 | Q26 | | | | |
| 2507 | B12 | 3551 | P2 | 5102 | J13 | | | | |
| 2503 | B17 | 3536 | C18 | 5101 | J17 | | | | |
| 2508 | B13 | 3537 | C18 | 5104 | J16 | | | | |
| 2490 | G31 | 3552 | R3 | 5103 | J18 | | | | |
| 2509 | B14 | 3544 | M12 | 5105 | K16 | | | | |
| 2510 | C14 | 3538 | D19 | 5110 | L19 | | | | |
| 2512 | B18 | 3539 | C18 | 5115 | I19 | | | | |
| 2513 | D17 | 3545 | P12 | 5423 | C26 | | | | |
| 2516 | B14 | 3540 | D18 | 5425 | D26 | | | | |
| 2514 | E17 | 3542 | F17 | 5426 | B25 | | | | |
| 2517 | C14 | 3543 | B16 | 5424 | G28 | | | | |
| 2515 | C17 | 3544 | C15 | 5430 | D29 | | | | |
| 2518 | B16 | 3546 | O13 | 5460 | F30 | | | | |
| 2520 | C15 | 3541 | D19 | 5467 | F26 | | | | |
| 2521 | D14 | 3547 | Q13 | 5503 | C13 | | | | |
| 2519 | B18 | 3617 | R2 | 5504 | B13 | | | | |
| 2523 | B15 | 3600 | K23 | 5505 | C16 | | | | |
| 2530 | F16 | 3601 | K23 | 5506 | B17 | | | | |
| 2528 | F19 | 3610 | O14 | 5510 | D14 | | | | |
| 2531 | E18 | 3602 | J23 | 5620 | K28 | | | | |
| 2537 | B13 | 3611 | Q14 | 5651 | W9 | | | | |
| 2535 | D17 | 3612 | S13 | 5652 | W9 | | | | |
| 2536 | C17 | 3613 | S13 | 5653 | O9 | | | | |
| 2538 | D15 | 3603 | K24 | 5654 | U9 | | | | |
| 2550 | O3 | 3614 | U14 | 6103 | I14 | | | | |
| 2551 | P2 | 3615 | W14 | 6105 | K15 | | | | |
| 2546 | S13 | 3624 | M5 | 6106 | K15 | | | | |
| 2547 | S13 | 3605 | M25 | 3106 | K15 | | | | |
| 2548 | T14 | 3616 | T14 | 6109 | J14 | | | | |
| 2549 | W14 | 3625 | M5 | 6107 | J18 | | | | |
| 2609 | O9 | 3606 | L25 | 6111 | I18 | | | | |
| 2610 | W10 | 3607 | L25 | 6120 | L18 | | | | |
| 2611 | W10 | 3608 | L25 | 6121 | L18 | | | | |
| 2600 | K23 | 3621 | N12 | 6122 | L18 | | | | |
| 2601 | M23 | 3611 | J23 | 6406 | F22 | | | | |
| 2602 | M25 | 3609 | M26 | 6407 | D23 | | | | |

5338


ROTATION CIRCUIT
+11V LOT
-15V-LOT
+13V-LOT
15V-LOT
GND-SUP
F3
R1
R2
7605 BC847B
7606 BC847B
7440-A LM358N
7440-B LM358N
7441 BC547B
7442 BC557B
6440 BAS216
6441 BAS216
0390
TO ROTATION COIL

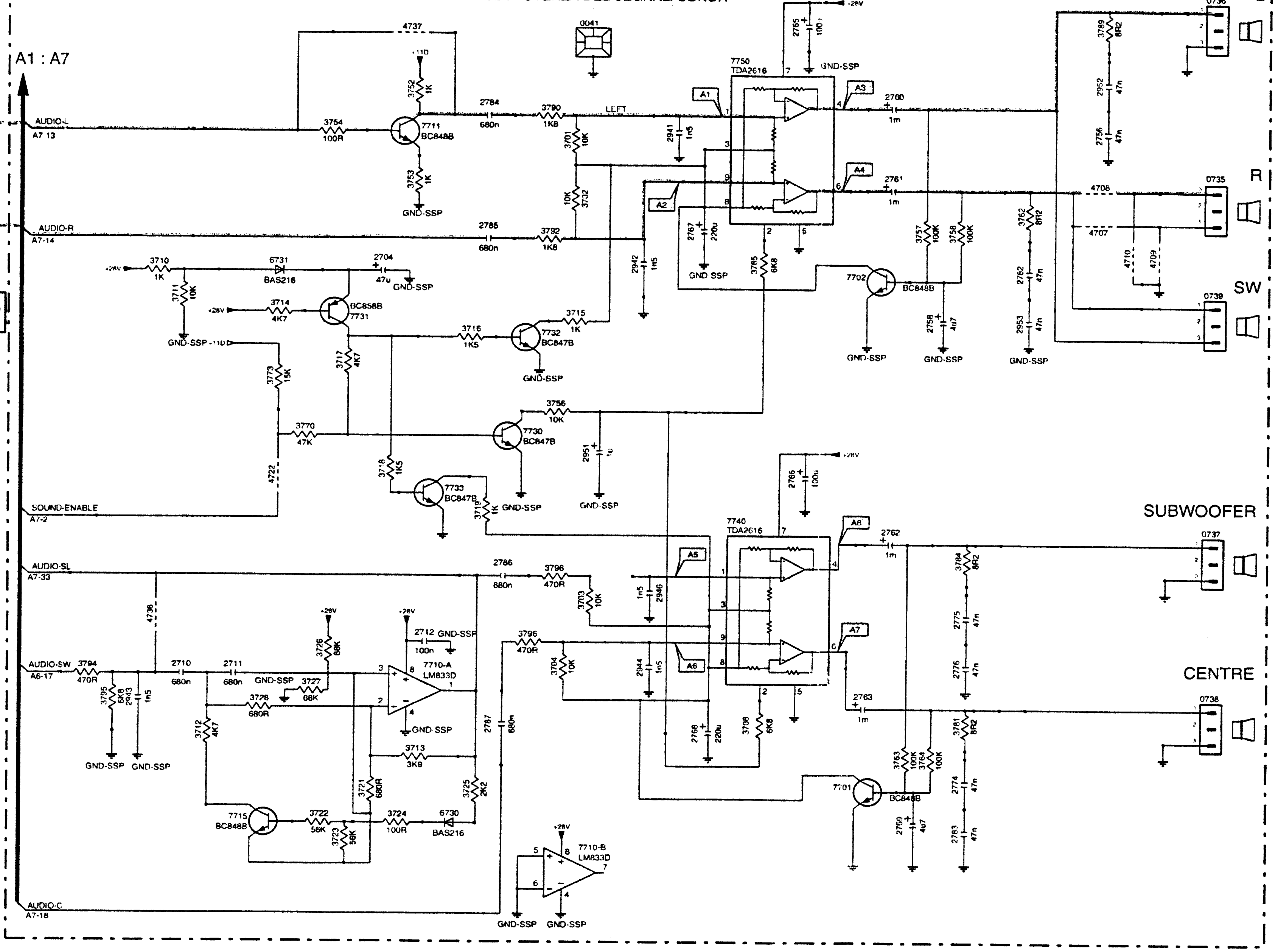
NON-PROTECTION ERROR

## HEADPHONE AMPLIFIER

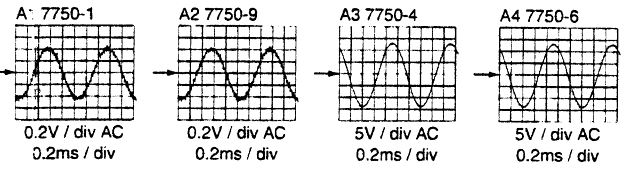

A12
A13
A14
A15
7720 BC847B
7722 BC857B
7724 BC847B
7721 BC847B
7723 BC857B
7725 BC847B
+11D
HEADPHONE-L
HEADPHONE-R
A7-37
A7-38
A7
O
0936
0930
L
R

## A5 AUDIO AMPLIFIER

SOUND POWER AMPLIFIER
GELUID-EINDVERSTERKER
AMPLIFICATEUR FINAL AUDIO
TONSIGNAL-ENDVERSTAERKER
AMPLIFICADOR FINAL DE AUDIO
AMPLIFICATORE DI POTENZA DEL SEGNALI SONOR


A1 : A7
AUDIO-L
A7-13
AUDIO-R
A7-14
SOUND-ENABLE
A7-2
AUDIO-SL
A7-33
AUDIO-SW
A6-17
AUDIO-C
A7-18
LLEFT
7750 TDA2616
7740 TDA2616
7711 BC848B
7731 BC858B
7732 BC847B
7730 BC847B
7733 BC847B
7702 BC848B
7701 BC848B
7710-A LM833D
7710-B LM833D
7715 BC848B
6731 BAS216
6730 BAS216
0041
A1
A2
A3
A4
A5
A6
A7
A8
+28V
GND-SSP
0736
0735
0739
0737
0738
L
R
SW
SUBWOOFER
CENTRE

## A5



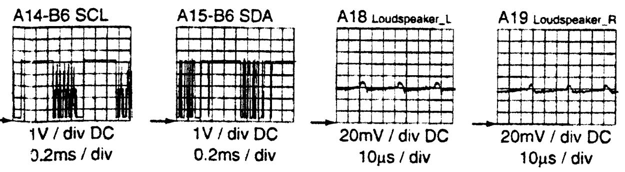
0.2V / div AC
0.2ms / div

0.2V / div AC
0.2ms / div

5V / div AC
0.2ms / div

5V / div AC
0.2ms / div

## B6

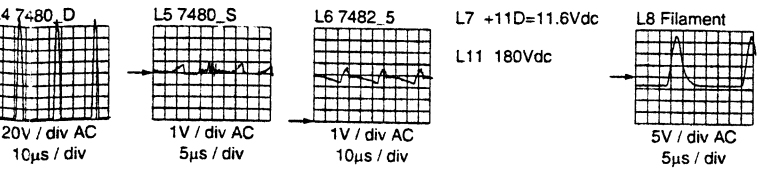


1V / div DC
0.2ms / div

1V / div DC
0.2ms / div

20mV / div DC
10µs / div

20mV / div DC
10µs / div



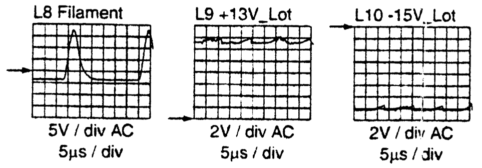
20V / div AC
10µs / div

1V / div AC
5µs / div

1V / div AC
10µs / div

L7 +11D=11.6Vdc

L11 180Vdc

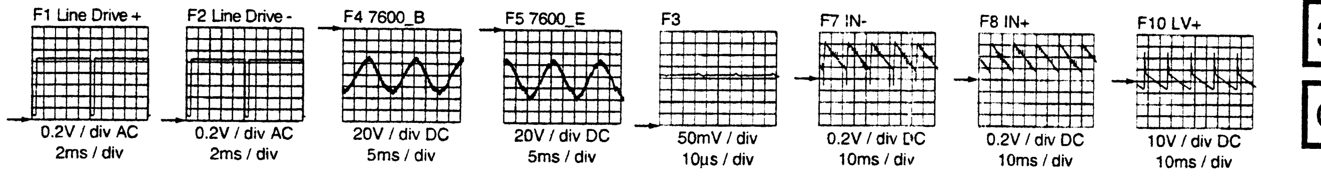


5V / div AC
5µs / div

2V / div AC
5µs / div

2V / div AC
5µs / div

## A4



0.2V / div AC
2ms / div

0.2V / div AC
2ms / div

20V / div DC
5ms / div

20V / div DC
5ms / div

50mV / div
10µs / div

0.2V / div DC
10ms / div

0.2V / div DC
10ms / div

10V / div DC
10ms / div

**3122 785 00240**

**CHASSIS EM2E**

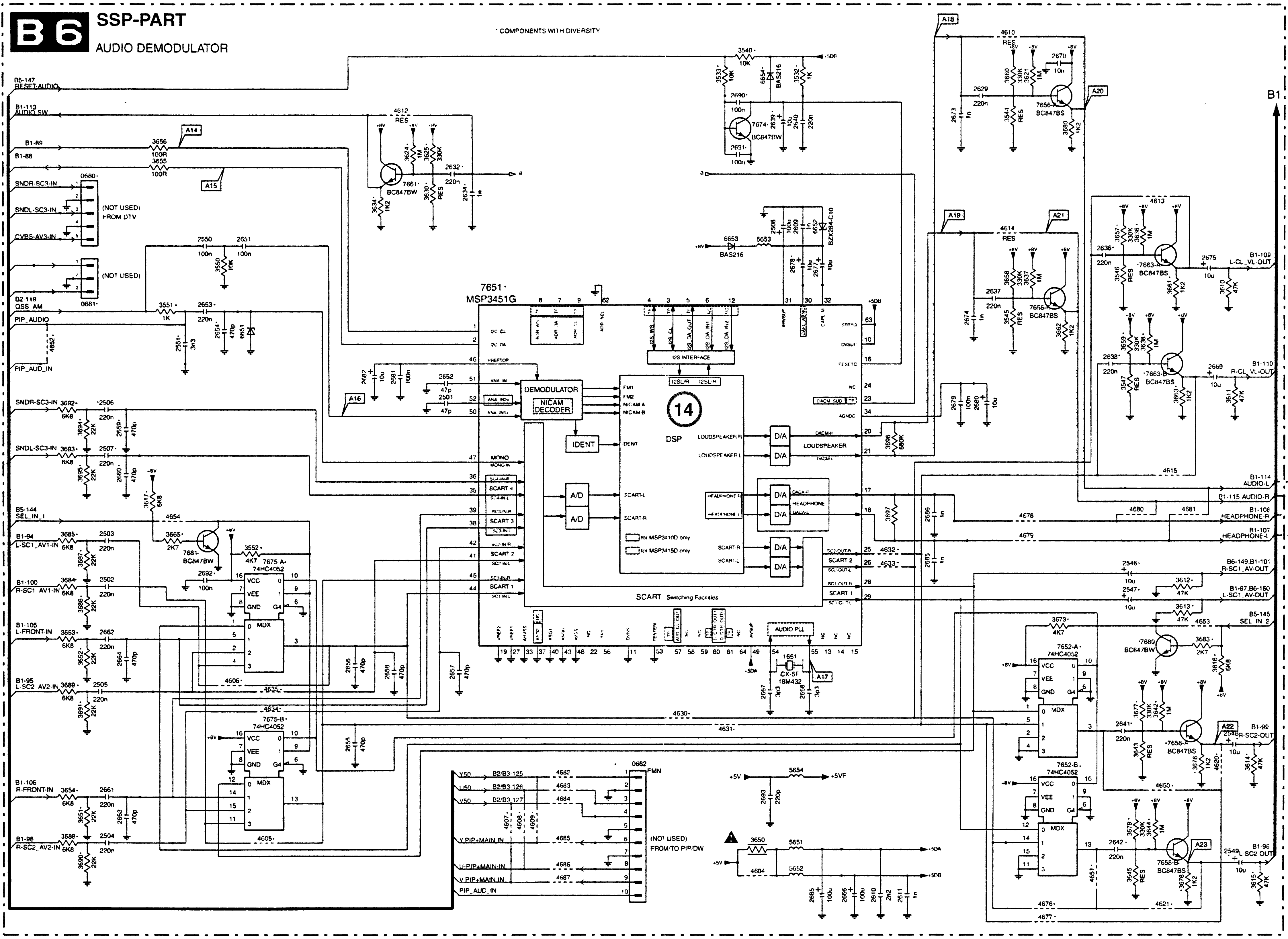
CL 96532156_091.eps
140400

| | | | | | |
|---|---|---|---|---|---|
| 2546 | S13 | 3624 | M5 | 6106 | K15 |
| 2547 | S13 | 3605 | M25 | 6108 | K15 |
| 2548 | T14 | 3616 | T14 | 6109 | J14 |
| 2549 | W14 | 3625 | M5 | 6107 | J18 |
| 2609 | O9 | 3606 | L25 | 6111 | I18 |
| 2610 | W10 | 3607 | L25 | 6120 | L18 |
| 2611 | W10 | 3608 | L25 | 6121 | L18 |
| 2600 | K23 | 3621 | N12 | 6122 | L18 |
| 2601 | M23 | 3611 | J23 | 6406 | F22 |
| 2602 | M25 | 3609 | M26 | 6407 | D23 |
| 2603 | M26 | 3630 | M5 | 6408 | C23 |
| 2605 | M24 | 3610 | M26 | 6405 | J28 |
| 2604 | L26 | 3612 | K25 | 6421 | B26 |
| 2610 | K25 | 3613 | K25 | 6422 | C26 |
| 2632 | M5 | 3614 | K24 | 6440 | N25 |
| 2629 | N11 | 3634 | O5 | 6441 | O25 |
| 2634 | M6 | 3615 | K25 | 6442 | K29 |
| 2620 | L26 | 3616 | K25 | 6465 | C31 |
| 2621 | M27 | 3618 | K24 | 6466 | G31 |
| 2637 | P11 | 3619 | M23 | 6468 | E31 |
| 2639 | M9 | 3617 | K26 | 6480 | E25 |
| 2622 | J27 | 3620 | M27 | 6482 | G23 |
| 2636 | O13 | 3621 | M28 | 6481 | F27 |
| 2640 | M9 | 3623 | M26 | 6483 | J28 |
| 2638 | P13 | 3636 | O13 | 6501 | B14 |
| 2624 | L28 | 3637 | O12 | 6502 | B14 |
| 2625 | L27 | 3622 | M28 | 6503 | C14 |
| 2641 | T13 | 3638 | P13 | 6504 | C14 |
| 2651 | O3 | 3624 | L28 | 6505 | B15 |
| 2627 | L28 | 3651 | U1 | 6506 | C15 |
| 2642 | W13 | 3630 | N23 | 6508 | C16 |
| 2653 | P3 | 3652 | T1 | 6507 | B18 |
| 2652 | Q5 | 3625 | L29 | 6510 | B16 |
| 2654 | P3 | 3631 | N23 | 6511 | E19 |
| 2629 | L29 | 3653 | S1 | 6515 | C15 |
| 2655 | T4 | 3626 | L29 | 6512 | E19 |
| 2656 | T4 | 3632 | M23 | 6514 | C17 |
| 2659 | Q2 | 3642 | T13 | 6516 | F16 |
| 2657 | T5 | 3654 | U1 | 6517 | F16 |
| 2660 | R2 | 3627 | L29 | 6518 | E15 |
| 2658 | T5 | 3633 | K23 | 6520 | C17 |
| 2661 | U2 | 3643 | U13 | 6521 | D18 |
| 2640 | L24 | 3644 | U13 | 6522 | D18 |
| 2662 | S2 | 3655 | M2 | 6600 | M24 |
| 2663 | U2 | 3629 | L29 | 6616 | K25 |
| 2664 | T2 | 3645 | W13 | 6619 | L28 |
| 2642 | K28 | 3656 | M2 | 6620 | J27 |
| 2665 | W9 | 3650 | W9 | 6621 | J27 |
| 2666 | W10 | 3640 | L23 | 6622 | K27 |
| 2667 | T9 | 3641 | L23 | 6623 | K28 |
| 2668 | T9 | 3642 | K24 | 6651 | P3 |
| 2653 | M27 | 3643 | K24 | 6652 | O9 |
| 2670 | N12 | 3665 | R2 | 6653 | O9 |
| 2669 | P14 | 3657 | O13 | 6654 | N9 |
| 2673 | M11 | 3658 | O12 | 6730 | X26 |
| 2674 | P11 | 3659 | P13 | 6731 | S25 |
| 2677 | O9 | 3660 | N12 | 7100 | L14 |
| 2681 | P5 | 3644 | K29 | 7101 | K16 |
| 2678 | O9 | 3645 | J28 | 7102 | J16 |
| 2682 | P5 | 3661 | O13 | 7103 | L17 |
| 2675 | O14 | 3662 | P12 | 7104 | L16 |
| 2679 | Q11 | 3663 | Q13 | 7440-K | N28 |
| 2680 | Q11 | 3653 | M26 | 7440-J | N26 |
| 2692 | S3 | 3652 | K29 | 7407 | J29 |
| 2685 | R11 | 3673 | S12 | 7441 | N27 |
| 2686 | R11 | 3684 | S1 | 7442 | O27 |
| 2690 | N9 | 3685 | R1 | 7482 | H24 |
| 2691 | M9 | 3686 | S1 | 7483 | G24 |
| 2693 | U9 | 3687 | R1 | 7502 | C16 |
| 2704 | S25 | 3688 | W1 | 7504 | B15 |
| 2710 | V24 | 3676 | U14 | 7505 | E15 |
| 2711 | V24 | 3677 | T13 | 7506 | E17 |
| 2712 | V26 | 3689 | T1 | 7510 | D18 |
| 2730 | Q18 | 3678 | W13 | 7511 | C19 |
| 2731 | S18 | 3690 | W1 | 7529 | F15 |
| 2732 | R21 | 3679 | U13 | 7528 | E19 |
| 2733 | T21 | 3680 | M12 | 7600 | K23 |
| 2734 | R20 | 3691 | T1 | 7602 | L25 |
| 2735 | S20 | 3692 | Q1 | 7603 | K24 |
| 2736 | R19 | 3693 | Q1 | 7605 | N23 |
| 2737 | T19 | 3694 | Q1 | 7606 | N24 |
| 2738 | Q19 | 3695 | R1 | 7610 | L22 |
| 2739 | S19 | 3683 | S14 | 7611 | L22 |
| 2756 | R31 | 3696 | Q10 | 7652-A | S12 |
| 2758 | S30 | 3697 | R10 | 7652-B | U12 |
| 2759 | X30 | 3701 | R27 | 7656-A | M12 |
| 2760 | Q30 | 3702 | R27 | 7656-B | P12 |
| 2761 | R30 | 3703 | V27 | 7658-A | U13 |
| 2762 | U30 | 3704 | V27 | 7658-B | W13 |
| 2763 | V29 | 3710 | S24 | 7620 | K27 |
| 2765 | Q29 | 3711 | S24 | 7663-A | O13 |
| 2766 | U29 | 3712 | W24 | 7663-B | P13 |
| 2767 | R28 | 3708 | W29 | 7651 | P6 |
| 2768 | W28 | 3713 | W26 | 7640 | L24 |
| 2774 | W30 | 3714 | S25 | 7661 | M5 |
| 2775 | V30 | 3715 | S27 | 7641 | K29 |
| 2776 | V30 | 3716 | S26 | 7675-A | S4 |
| 2784 | Q26 | 3717 | T25 | 7675-B | T4 |
| 2785 | R26 | 3718 | U25 | 7652 | K30 |
| 2786 | U26 | 3719 | U26 | 7710-R | X27 |
| 2782 | S31 | 3721 | W25 | 7674 | M9 |
| 2783 | X30 | 3722 | X25 | 7710-Q | V26 |
| 2787 | W26 | 3723 | X25 | 7681 | R3 |
| 2943 | W23 | 3730 | R18 | 7680 | S13 |
| 2941 | R28 | 3731 | S18 | 7701 | W29 |
| 2942 | S28 | 3724 | X26 | 7702 | S29 |
| 2944 | V28 | 3732 | T18 | 7711 | R26 |
| 2946 | V28 | 3725 | W26 | 7715 | X24 |
| 2951 | T27 | 3726 | V25 | 7720 | Q20 |
| 2952 | Q31 | 3733 | R18 | 7721 | S20 |
| 2953 | S31 | 3727 | V25 | 7722 | R20 |
| 3101 | J14 | 3728 | W24 | 7724 | R19 |
| 3102 | K14 | 3734 | R19 | 7723 | T20 |
| 3103 | J14 | 3735 | T19 | 7725 | S19 |
| 3104 | J15 | 3736 | Q19 | 7731 | S25 |
| 3105 | J14 | 3737 | S19 | 7730 | T27 |
| 3106 | K13 | 3738 | R20 | 7732 | S27 |

| 9622 | - | WR | WR | | |
|---|---|---|---|---|---|

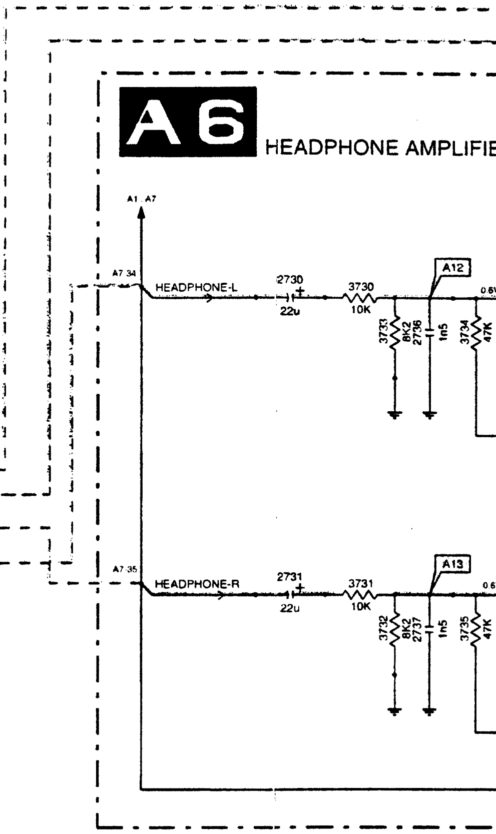
# B6 SSP-PART

AUDIO DEMODULATOR

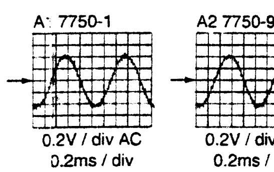

* COMPONENTS WITH DIVERSITY
B5-147 RESET-AUDIO
B1-113 AUDIO-SW
B1-89
B1-88
SNDR-SC3-IN
SNDL-SC3-IN
CVBS-AV3-IN
(NOT USED) FROM D1V
(NOT USED)
B2 119 QSS_AM
PIP_AUDIO
PIP_AUD_IN
B5-144 SEL_IN_1
B1-94 L-SC1_AV1-IN
B1-100 R-SC1_AV1-IN
B1-105 L-FRONT-IN
B1-95 L-SC2_AV2-IN
B1-106 R-FRONT-IN
B1-96 R-SC2_AV2-IN
7651 MSP3451G
DEMODULATOR
NICAM DECODER
IDENT
DSP
14
I2S INTERFACE
LOUDSPEAKER
HEADPHONE
A/D
D/A
SCART Switching Facilities
for MSP3410D only
for MSP3415D only
AUDIO PLL
1651 CX-5F 18M432
7675-A 74HC4052
7675-B 74HC4052
7652-A 74HC4052
7652-B 74HC4052
MDX
7661 BC847BW
7674 BC847BW
7681 BC847BW
7656-A BC847BS
7656-B BC847BS
7663-A BC847BS
7663-B BC847BS
7680 BC847BW
7658-A BC847BS
7658-B BC847BS
0682 FMN
(NOT USED) FROM/TO PIP/DW
Y_PIP+MAIN_IN
U_PIP+MAIN_IN
V_PIP+MAIN_IN
PIP_AUD_IN
B1-109 L-CL_VL OUT
B1-110 R-CL_VL-OUT
B1-114 AUDIO-L
B1-115 AUDIO-R
B1-108 HEADPHONE-R
B1-107 HEADPHONE-L
B6-149,B1-101 R-SC1_AV-OUT
B1-97,B6-150 L-SC1_AV-OUT
B5-145 SEL_IN_2
B1-99 R-SC2-OUT
B1-98 L-SC2 OUT
B1
+5V
+5VF
+5DA
+5DB
A14
A15
A16
A17
A18
A19
A20
A21
A22
A23

# A6

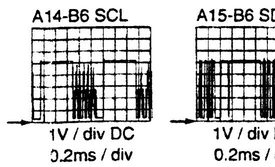
HEADPHONE AMPLIFIER


A1 A7
HEADPHONE-L
HEADPHONE-R
2730 22u
3730 10K
2731 22u
3731 10K
A12
A13

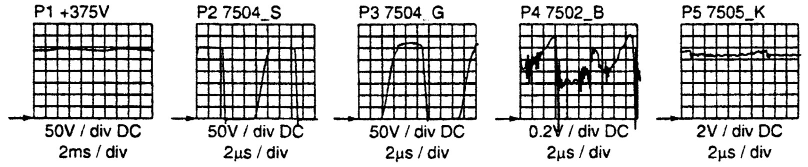
**A5**



**B6**



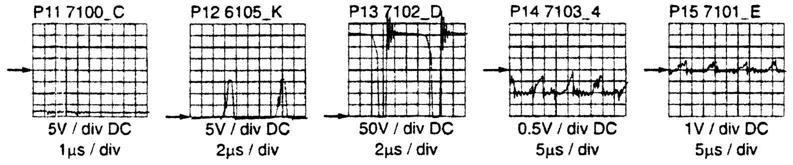
**A1**



P6 VBATT=140Vdc

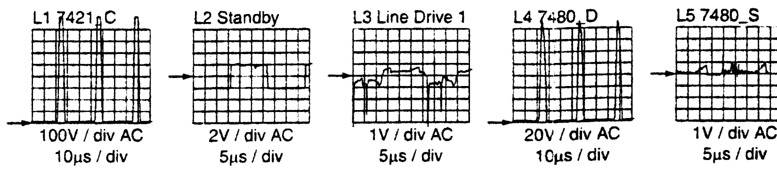
P7 Sound Supply =33Vdc

**A2**

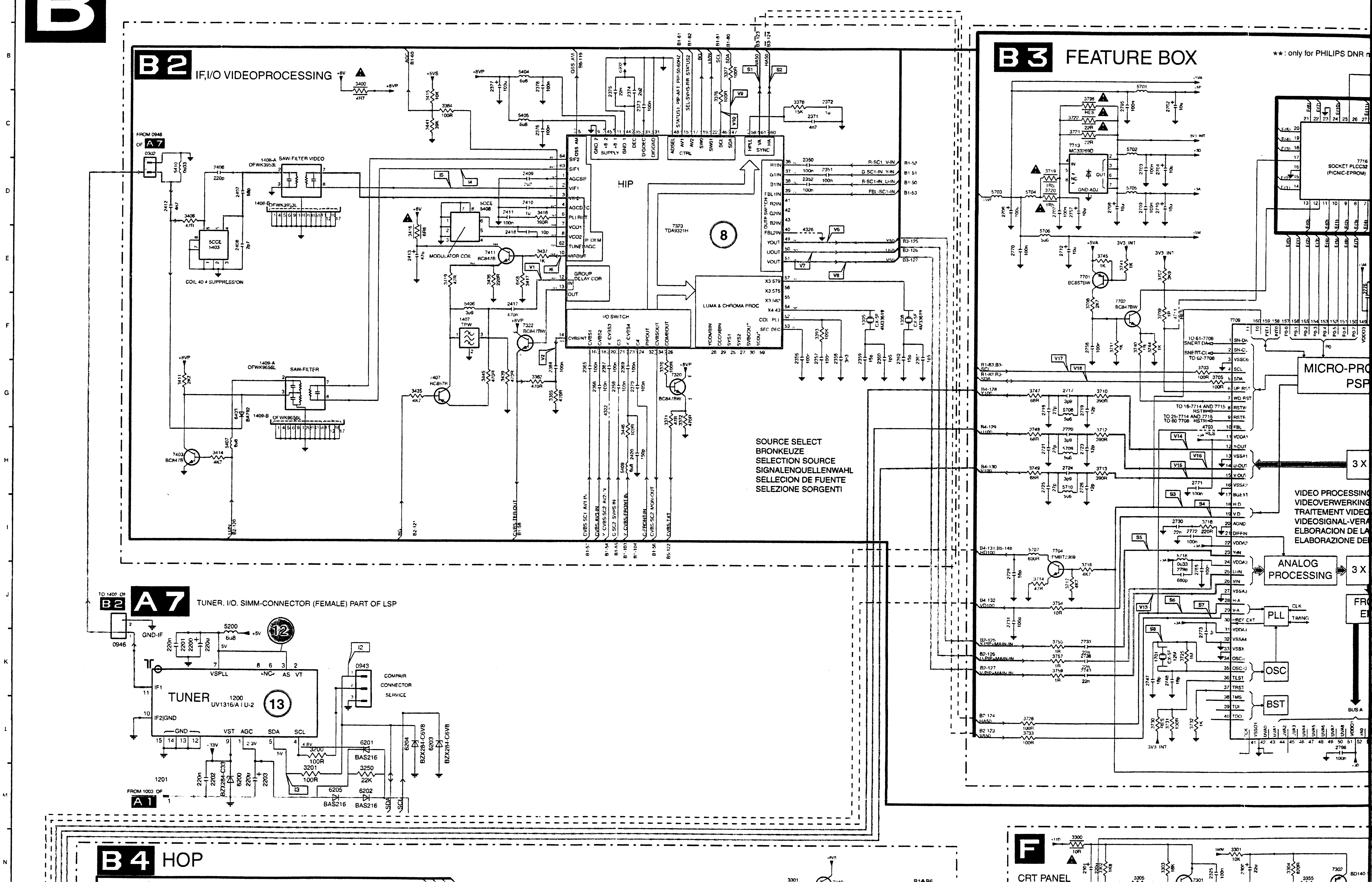


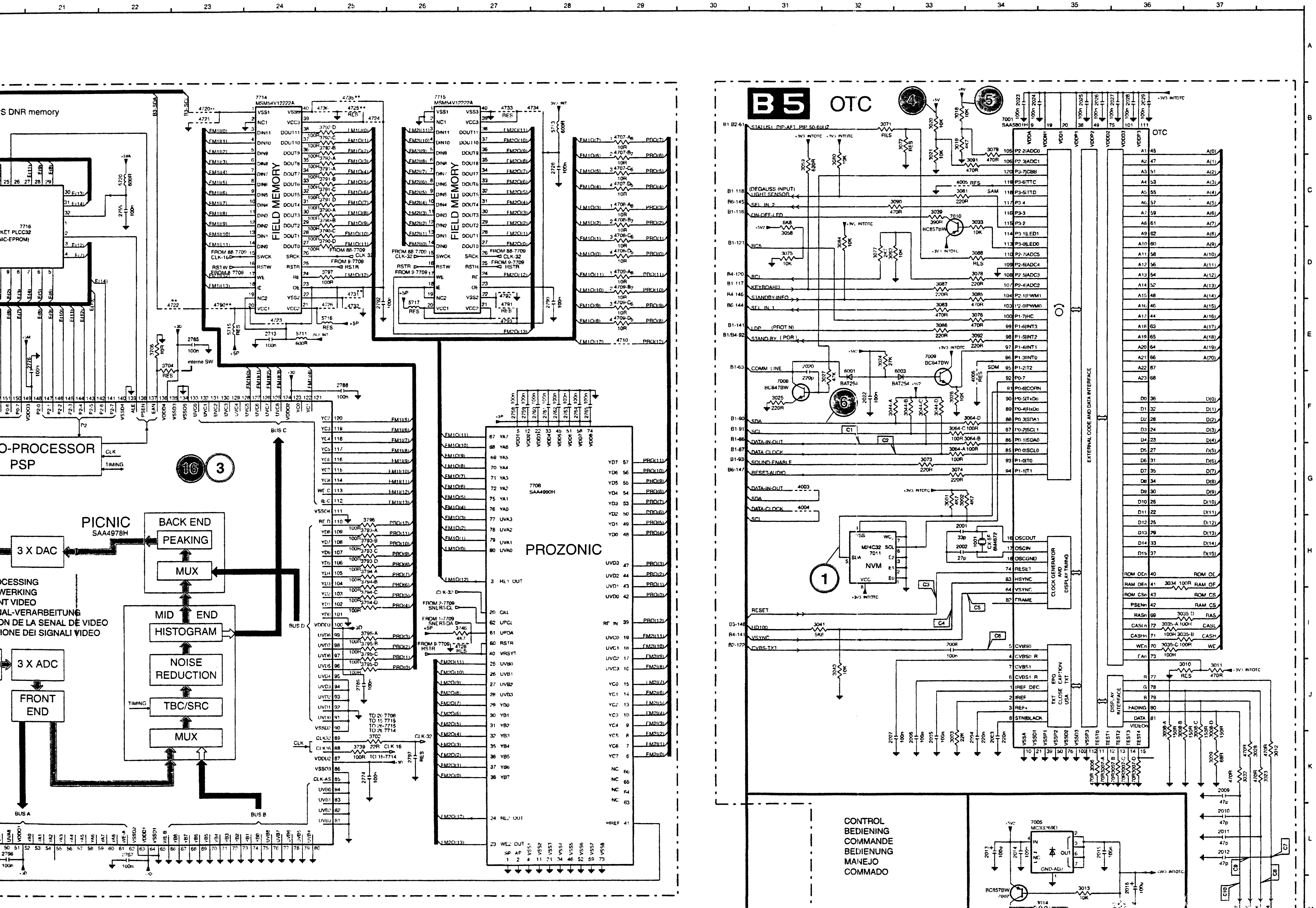
P16 5.2V

**A3**

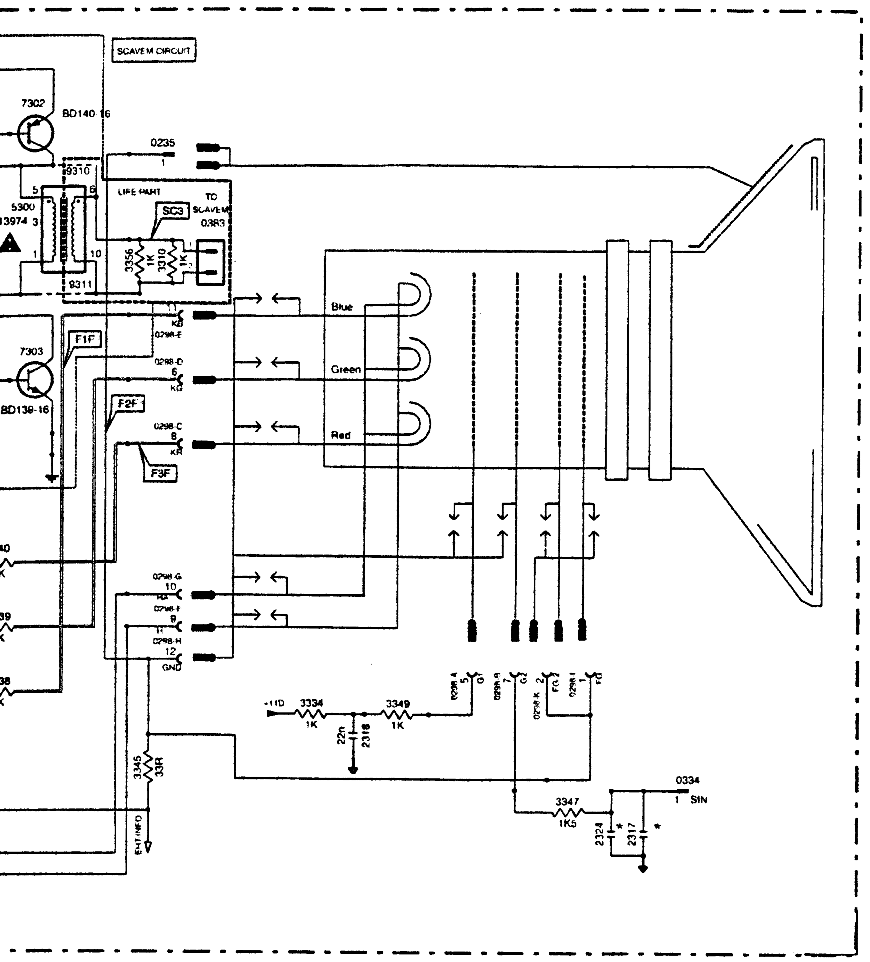


# B SSP (Small Signal Panel) FOR DIAGRAM B5 SEE OTHER SIDE


B2 IF,I/O VIDEOPROCESSING
B3 FEATURE BOX
**: only for PHILIPS DNR
A7 TUNER, I/O, SIMM-CONNECTOR (FEMALE) PART OF LSP
B4 HOP
F CRT PANEL
FROM 0946 OF A7
TO 1400 OF B2
FROM 1003 OF A1
1408-A OFWK3953L SAW-FILTER VIDEO
1408-B OFWK3953L
1409-A OFWK9656L SAW-FILTER
1409-B OFWK9656L
COIL 40.4 SUPPRESSION
MODULATOR COIL
HIP
7323 TDA9321H
8
SUPPLY
CTRL
SYNC
I/O SWITCH
GROUP DELAY COR
LUMA & CHROMA PROC
OUTP SWITCH
IF-DEM
TUNE/AGC
SOURCE SELECT
BRONKEUZE
SELECTION SOURCE
SIGNALENQUELLENWAHL
SELLECION DE FUENTE
SELEZIONE SORGENTI
TUNER 1200 UV1316/A I U-2
13
12
GND-IF
COMPAIR CONNECTOR SERVICE
0943
0946
1201
BAS216
BZX284-C6V8
BZX284-C33
7713 MC33269D
GND-ADJ
7716 SOCKET PLCC32 (PICNIC-EPROM)
7709
MICRO-PRO PSP
VIDEO PROCESSING
VIDEOVERWERKING
TRAITEMENT VIDEO
VIDEOSIGNAL-VERA
ELBORACION DE LA
ELABORAZIONE DE
ANALOG PROCESSING
PLL
OSC
BST
3 X
CLK
TIMING
BUS A
7701 BC857BW
7702 BC847BW
7704 PMBT2369
7411 BC847B
7322 BC847BW
7407 BC857B
7403 BC847B
7320 BC847BW
1407 TPW
5408
5403
CVBS-TER-OUT
CVBS SC1 AV1 IN
CVBS-AV3-IN
Y CVBS-SC2 AV2-IN
C SC2 SVHS IN
Y CVBS-FRONT-IN
C-FRONT-IN
CVBS-SC2 MON-OUT
CVBS-TXT
R-SC1 V-IN
G SC1-IN Y-IN
B-SC1-IN U-IN
FBL-SC1-IN
B1-52
B1-51
B1-50
B1-53
B3-125
B3-126
B3-127
V-PIP+MAIN-IN
U-PIP+MAIN-IN
Y-PIP+MAIN-IN
SOURCE SELECT


B5
OTC
PROZONIC
FIELD MEMORY
FIELD MEMORY
PICNIC
SAA4978H
BACK END
PEAKING
MUX
MID END
HISTOGRAM
NOISE REDUCTION
TBC/SRC
MUX
3 X DAC
3 X ADC
FRONT END
O-PROCESSOR PSP
S DNR memory
NVM
M24C32
7011
7001 SAA5801H
7706 SAA4990H
7714 MSM54V12222A
7715 MSM54V12222A
EXTERNAL CODE AND DATA INTERFACE
CLOCK GENERATOR AND DISPLAY TIMING
TXT EPG CLOSE CAPTION USA
DISPLAY INTERFACE
OCESSING
WERKING
NT VIDEO
IAL-VERARBEITUNG
ON DE LA SENAL DE VIDEO
IONE DEI SIGNALI VIDEO
CONTROL
BEDIENING
COMMANDE
BEDIENUNG
MANEJO
COMMADO
7005 MC33269D
BUS A
BUS B
BUS C
BUS D
16
3
1
4
5
6
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37

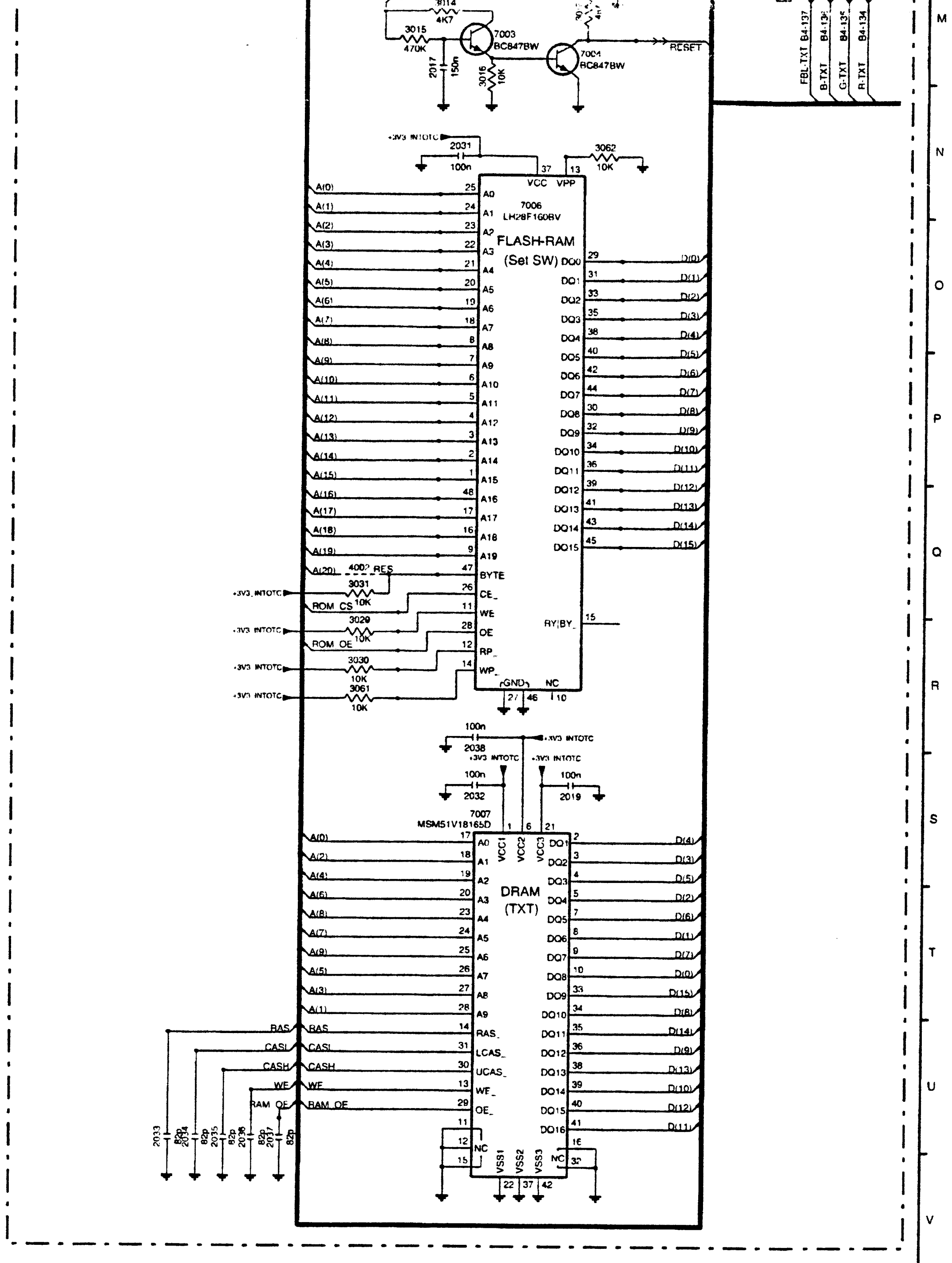
| | | | | | |
|---|---|---|---|---|---|
| c001 | T11 | 3001 | G34 | 3706 | E22 |
| c002 | B9 | 3002 | G34 | 3707 | E18 |
| 0031 | R20 | 3003 | K34 | 3708 | F16 |
| 0224 | R16 | 3006 | K36 | 3709 | F18 |
| 0235 | N21 | 3007-A | K36 | 3710 | G17 |
| 0298-A | R23 | 3007-B | K37 | 3711 | F17 |
| 0298-B | R23 | 3007-C | K37 | 3712 | G17 |
| 0298-C | P21 | 3007-D | K37 | 3713 | H17 |
| 0298-D | P21 | 3008-A | J37 | 3714 | J16 |
| 0298-E | P21 | 3008-B | J37 | 3716 | I16 |
| 0298-F | Q21 | 3008-C | J37 | 3717 | J16 |
| 0298-G | Q21 | 3008-D | J37 | 3718 | I18 |
| 0298-H | R21 | 3009 | K37 | 3719 | D16 |
| 0298-I | R24 | 3010 | J37 | 3720 | D16 |
| 0298-K | R24 | 3011 | J37 | 3721 | C16 |
| 0302 | C1 | 3012 | K37 | 3722 | C16 |
| 0334 | S25 | 3013 | M35 | 3725 | K18 |
| 0340 | O16 | 3014 | M35 | 3728 | L16 |
| 0383 | O21 | 3015 | M34 | 3730 | L17 |
| 1001 | H35 | 3016 | M35 | 3731 | L18 |
| 1301 | T5 | 3017 | M36 | 3732 | L18 |
| 1305 | F12 | 3018 | B34 | 3733 | L16 |
| 1308 | F13 | 3019 | B34 | 3739 | K25 |
| 1407 | F6 | 3020 | B34 | 3740 | F17 |
| 1408-A | C3 | 3021 | B34 | 3741 | E17 |
| 1408-B | D3 | 3023 | K37 | 3744 | F17 |
| 1409-A | F3 | 3024 | E33 | 3745 | E17 |
| 1409-B | G3 | 3025 | F32 | 3746 | I27 |
| 1701 | K18 | 3026 | F34 | 3747 | G16 |
| 2001 | H34 | 3027 | F33 | 3748 | G16 |
| 2002 | H34 | 3028 | K37 | 3749 | H16 |
| 2003 | K35 | 3029 | R34 | 3754 | J16 |
| 2004 | K35 | 3030 | R34 | 3755 | K16 |
| 2005 | K34 | 3031 | Q34 | 3757 | K16 |
| 2006 | K34 | 3032 | K35 | 3759 | K16 |
| 2007 | K33 | 3033 | C35 | 3790-A | C25 |
| 2008 | I34 | 3034 | H37 | 3790-B | C25 |
| 2009 | K37 | 3035-A | I37 | 3790-C | D25 |
| 2010 | K37 | 3035-B | I37 | 3790-D | D25 |
| 2011 | K37 | 3035-C | I37 | 3791-A | C25 |
| 2012 | K37 | 3035-D | I38 | 3791-B | C25 |
| 2013 | L34 | 3039 | C34 | 3791-C | C25 |
| 2014 | L34 | 3040 | J33 | 3791-D | C25 |
| 2015 | L35 | 3041 | I32 | 3792-A | C25 |
| 2016 | M36 | 3044-A | F33 | 3792-B | B25 |
| 2017 | M34 | 3044-B | F34 | 3792-C | B25 |
| 2019 | S36 | 3044-C | F34 | 3792-D | B25 |
| 2020 | E32 | 3044-D | F34 | 3793-A | H25 |
| 2022 | F33 | 3058 | D32 | 3793-B | H25 |
| 2023 | B35 | 3059 | C32 | 3793-C | H25 |
| 2024 | B35 | 3060 | D33 | 3793-D | H25 |
| 2025 | B36 | 3061 | R34 | 3794-A | H25 |
| 2026 | B36 | 3062 | N36 | 3794-B | H25 |
| 2027 | B37 | 3064-A | G34 | 3794-C | I25 |
| 2028 | B37 | 3064-B | F35 | 3794-D | I25 |
| 2029 | B37 | 3064-C | F34 | 3795-A | I25 |
| 2031 | N35 | 3064-D | F35 | 3795-B | I25 |
| 2032 | S35 | 3071 | B33 | 3795-C | I25 |
| 2033 | U32 | 3072 | B34 | 3795-D | J25 |
| 2034 | U33 | 3073 | G34 | 3796 | H25 |
| 2035 | U33 | 3074 | G34 | 3797 | D25 |
| 2036 | U33 | 3075 | D32 | 3798 | C16 |
| 2037 | U33 | 3076 | E35 | 4002 | E39 |
| 2038 | R35 | 3077 | D33 | 4003 | G32 |
| 2300 | V11 | 3078 | D35 | 4004 | G32 |
| 2300 | N19 | 3079 | B35 | 4005 | C34 |
| 2301 | N16 | 3080 | C33 | 4006 | F35 |
| 2302 | N17 | 3081 | C34 | 4301 | P4 |
| 2303 | R9 | 3083 | E34 | 4306 | T4 |
| 2303 | N19 | 3084 | D33 | 4310 | R11 |
| 2304 | T8 | 3085 | D35 | 4311 | S13 |
| 2304 | N19 | 3086 | E34 | 4322 | G8 |
| 2305 | T8 | 3087 | D34 | 4326 | E11 |
| 2305 | O17 | 3088 | D35 | 4703 | G18 |
| 2306 | U10 | 3090 | C34 | 4707-A | B29 |
| 2306 | O17 | 3091 | C35 | 4707-B | B29 |
| 2307 | R4 | 3092 | E35 | 4707-C | C29 |
| 2307 | O19 | 3300 | U11 | 4707-D | C29 |
| 2308 | S9 | 3300 | N16 | 4708-A | C29 |
| 2308 | P17 | 3301 | N12 | 4708-B | C29 |
| 2309 | Q4 | 3301 | N19 | 4708-C | D29 |
| 2309 | P19 | 3302 | N17 | 4708-D | D29 |
| 2310 | Q4 | 3303 | N18 | 4709-A | D29 |
| 2310 | P17 | 3304 | U12 | 4709-B | D29 |
| 2311 | U6 | 3304 | N20 | 4709-C | E29 |
| 2312 | Q17 | 3305 | N17 | 4709-D | E29 |
| 2313 | S9 | 3306 | R9 | 4710 | E29 |
| 2313 | R17 | 3306 | N18 | 4711 | F18 |
| 2314 | R3 | 3307 | R10 | 4720 | B23 |
| 2315 | R3 | 3307 | O17 | 4721 | B23 |
| 2315 | O16 | 3308 | R10 | 4722 | E23 |
| 2316 | R17 | 3308 | O20 | 4723 | E24 |
| 2317 | R4 | 3309 | R12 | 4724 | B25 |
| 2317 | S24 | 3309 | O19 | 4725 | B25 |
| 2318 | R4 | 3310 | Q9 | 4726 | E25 |
| 2318 | R22 | 3310 | O21 | 4728 | I27 |
| 2319 | T3 | 3311 | T8 | 4731 | D25 |
| 2320 | U4 | 3311 | O17 | 4732 | E25 |
| 2320 | R18 | 3312 | T8 | 4733 | B27 |
| 2321 | P4 | 3312 | O18 | 4734 | B28 |
| 2321 | Q17 | 3313 | U9 | 4735 | B25 |
| 2322 | P4 | 3313 | O18 | 4736 | B25 |
| 2322 | R17 | 3314 | T8 | 4790 | E23 |
| 2323 | O4 | 3314 | O18 | 4791 | E27 |
| 2323 | R17 | 3315 | S9 | 4792 | D27 |
| 2324 | T7 | 3315 | O17 | 4793 | E27 |
| 2324 | S24 | 3316 | U10 | 5300 | O20 |
| [illegible] | [illegible] | 3316 | P20 | 5301 | R3 |


SCAVEM CIRCUIT
7302
BD140
0235
5300
LIFE PAINT
SC3
TO SCAVEM
0383
9310
9311
3356
3310
Blue
Green
Red
7303
BD139-16
F1F
F2F
F3F
0298
GND
3334
1K
3349
1K
2318
3347
1K5
0334
SIN
3345
33R
2324
2317

# Diversity Tables

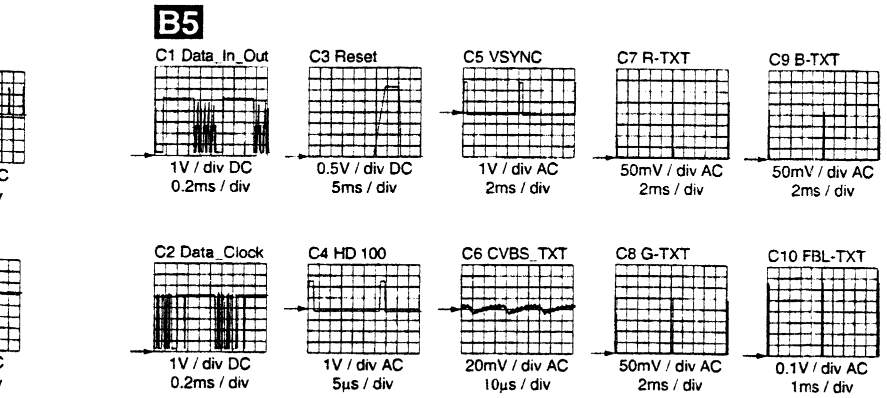
| Diversity CRT-Panel (F) | | | | | |
|---|---|---|---|---|---|
| PosNr | 29" | 25" | 28" | 28" WS | 32" WS |
| 0298 | - | - | - | - | SOC 9P |
| 0298 | CON 8P | CON 8P | CON 8P | CON 8P | - |
| 0383 | CON 02P | - | - | CON 02P | CON 02P |
| 2300 | 22U | - | - | 22U | 22U |
| 2301 | 220U | - | - | 220U | 220U |
| 2302 | 3P3 | - | - | 3P3 | 3P3 |
| 2303 | 470P | - | - | 470P | 470P |
| 2304 | 22N | - | - | 22N | 22N |
| 2305 | 47U | - | - | 47U | 47U |
| 2306 | 100N | - | - | 100N | 100N |
| 2307 | 22N | - | - | 22N | 22N |
| 2308 | 15P | - | - | 15P | 15P |
| 2309 | 22N | - | - | 22N | 22N |
| 2310 | 18P | - | - | 18P | 18P |
| 2312 | 22P | - | - | 22P | 22P |
| 2317 | 4N7 | 4N7 | 4N7 | 4N7 | - |
| 2317 | 4N7 | 4N7 | 4N7 | 4N7 | - |
| 2321 | - | 68P | 68P | - | - |
| 2322 | - | 82P | 82P | - | - |
| 2323 | - | 56P | 56P | - | - |
| 2324 | - | - | - | - | 820P |
| 2325 | 100N | - | - | 100N | 100N |
| 3300 | FUSE 10R | - | - | FUSE 10R | FUSE 10R |
| 3301 | 3W 10K | - | - | 3W 10K | 3W 10K |
| 3302 | 1K8 | - | - | 1K8 | 1K8 |
| 3303 | 18K | - | - | 18K | 18K |
| 3304 | 820R | - | - | 820R | 820R |
| 3305 | 330R | - | - | 330R | 330R |
| 3306 | 4R7 | - | - | 4R7 | 4R7 |
| 3307 | 10R | - | - | 10R | 10R |
| 3308 | 56K | - | - | 56K | 56K |
| 3309 | 150R | - | - | 150R | 150R |
| 3310 | 1K | - | - | 1K | 1K |
| 3311 | 100R | - | - | 100R | 100R |
| 3312 | 2K2 | - | - | 2K2 | 2K2 |
| 3313 | 220R | - | - | 220R | 220R |
| 3314 | 220R | - | - | 220R | 220R |
| 3315 | 1K5 | - | - | 1K5 | 1K5 |
| 3316 | 56K | - | - | 56K | 56K |
| 3317 | 1K2 | - | - | 1K2 | 1K2 |
| 3318 | 15R | - | - | 15R | 15R |
| 3319 | 820R | - | - | 820R | 820R |
| 3320 | 1K | - | - | 1K | 1K |
| 3335 | 100R | - | - | 100R | 100R |
| 3335 | - | 1K | 1K | - | - |
| 3336 | 100R | - | - | 100R | 100R |
| 3336 | - | 1K | 1K | - | - |
| 3337 | 100R | - | - | 100R | 100R |
| 3337 | - | 1K | 1K | - | - |
| 3355 | 4R7 | - | - | 4R7 | 4R7 |
| 3356 | 1K | - | - | 1K | 1K |
| 3357 | 4R7 | - | - | 4R7 | 4R7 |
| 5300 | TFM | - | - | TFM | TFM |
| 7300 | SIGF199 | - | - | SIGF199 | SIGF199 |
| 7301 | SIGF370 | - | - | SIGF370 | SIGF370 |
| 7302 | TRA POW | - | - | TRA POW | TRA POW |
| 7303 | TRA POW | - | - | TRA POW | TRA POW |
| 9305 | WR | - | - | WR | WR |
| 9308 | WR | - | - | WR | WR |
| 9309 | WR | - | - | WR | WR |
| 9312 | WR | - | - | WR | WR |
| 9313 | WR | - | - | WR | WR |
| 9424 | - | - | - | - | WR |

| Diversity Small Signal Panel (B3) | | | |
|---|---|---|---|
| Item | 100HZ INCR ST | DS VIRT DLB | 100HZ DLB |
| 2728 | - | 100N | - |
| 2758 | - | 100N | - |
| 2759 | - | 100N | - |
| 2760 | - | 100N | - |
| 2761 | - | 100N | - |
| 2762 | - | 100N | - |
| 2763 | - | 100N | - |
| 2764 | - | 100N | - |
| 2765 | - | 100N | - |
| 2790 | - | 100N | - |
| 3793 | 10R | 100R | 10R |
| 3794 | 10R | 100R | 10R |
| 3795 | 10R | 100R | 10R |
| 3796 | 10R | 100R | 10R |
| 4707 | 10R | - | 10R |
| 4708 | 10R | - | 10R |
| 4709 | 10R | - | 10R |
| 4710 | JUMP | - | JUMP |
| 4734 | - | JUMP | - |
| 4792 | - | JUMP | - |
| 4793 | - | JUMP | - |
| 5713 | - | FXDIND | - |
| 7708 | - | SAA4990H | - |
| 7715 | - | MSM54V12222A-30JS | - |

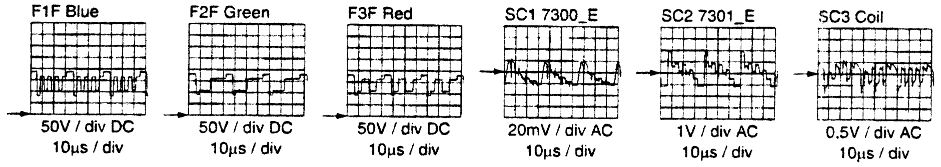

3015
470K
7003
BC847BW
7004
BC847BW
RESET
FBL-TXT
B-TXT
G-TXT
R-TXT
+3V3_INTOTC
2031
100n
3062
10K
VCC
VPP
7006
LH28F160BV
FLASH-RAM
(Set SW)
BYTE
CE_
WE
OE
RP_
WP_
RY/BY_
GND
NC
ROM_CS
ROM_OE
3031
3029
3030
3061
10K
2038
2032
2019
100n
7007
MSM51V18165D
DRAM
(TXT)
RAS
CASL
CASH
WE
RAM_OE
VCC1
VCC2
VCC3
VSS1
VSS2
VSS3

| | | | | | |
|---|---|---|---|---|---|
| [illegible] | [illegible] | 3316 | P20 | 5301 | R3 |
| 2325 | N18 | 3317 | S10 | 5302 | R3 |
| 2328 | O8 | 3317 | P17 | 5403 | E2 |
| 2329 | O7 | 3318 | S9 | 5404 | B7 |
| 2330 | O7 | 3318 | P19 | 5405 | C7 |
| 2331 | O7 | 3319 | S5 | 5406 | F6 |
| 2332 | R3 | 3319 | P20 | 5407 | H3 |
| 2333 | Q11 | 3320 | Q3 | 5408 | D6 |
| 2334 | Q9 | 3320 | P17 | 5409 | H9 |
| 2335 | T7 | 3321 | Q3 | 5410 | D2 |
| 2336 | Q9 | 3322 | Q13 | 5701 | B17 |
| 2338 | S3 | 3322 | O16 | 5702 | C17 |
| 2339 | R11 | 3323 | U6 | 5703 | D15 |
| 2340 | V12 | 3324 | U5 | 5704 | D16 |
| 2341 | R2 | 3325 | T6 | 5705 | D17 |
| 2350 | D11 | 3326 | T6 | 5706 | E16 |
| 2351 | D12 | 3327 | T6 | 5707 | I16 |
| 2352 | D11 | 3328 | R9 | 5708 | G16 |
| 2356 | F11 | 3329 | R2 | 5709 | H16 |
| 2357 | F11 | 3330 | T3 | 5710 | H16 |
| 2358 | F12 | 3331 | U4 | 5711 | E24 |
| 2359 | F12 | 3332 | T3 | 5713 | B28 |
| 2360 | F12 | 3333 | U4 | 5715 | E23 |
| 2361 | F13 | 3334 | U5 | 5716 | E25 |
| 2362 | F13 | 3334 | R22 | 5717 | E26 |
| 2365 | G8 | 3335 | T7 | 5718 | I18 |
| 2366 | G8 | 3335 | Q17 | 5720 | C22 |
| 2367 | G8 | 3336 | S6 | 6001 | F33 |
| 2368 | G8 | 3336 | R17 | 6003 | F34 |
| 2369 | G9 | 3337 | T6 | 6301 | R11 |
| 2370 | G9 | 3337 | Q17 | 6302 | T8 |
| 2371 | C11 | 3338 | T7 | 6303 | U9 |
| 2372 | C12 | 3338 | R20 | 6304 | U10 |
| 2373 | C9 | 3339 | Q20 | 6305 | T5 |
| 2374 | B9 | 3340 | O10 | 6305 | Q20 |
| 2375 | B8 | 3340 | Q20 | 6306 | U6 |
| 2376 | C7 | 3341 | O10 | 6306 | Q20 |
| 2377 | B7 | 3341 | R17 | 6307 | U6 |
| 2378 | B7 | 3342 | P10 | 6307 | R19 |
| 2384 | G8 | 3342 | Q17 | 6309 | Q12 |
| 2395 | P4 | 3343 | P12 | 6310 | Q11 |
| 2396 | P3 | 3343 | R16 | 6310 | R18 |
| 2397 | P4 | 3344 | Q11 | 6311 | Q12 |
| 2398 | S6 | 3345 | P9 | 6315 | S13 |
| 2406 | D3 | 3345 | R21 | 6317 | R13 |
| 2407 | D3 | 3346 | P9 | 6318 | R12 |
| 2408 | E3 | 3347 | P9 | 6319 | O9 |
| 2409 | D7 | 3347 | S24 | 6320 | P10 |
| 2410 | D7 | 3348 | P10 | 6321 | P9 |
| 2411 | D7 | 3348 | R16 | 6334 | U5 |
| 2412 | D2 | 3349 | P11 | 6403 | G3 |
| 2413 | E5 | 3349 | R23 | 7001 | B35 |
| 2417 | F7 | 3350 | P11 | 7002 | M34 |
| 2418 | E7 | 3350 | Q19 | 7003 | M35 |
| 2420 | H9 | 3351 | Q19 | 7004 | M35 |
| 2702 | C18 | 3352 | R19 | 7005 | L34 |
| 2703 | D17 | 3354 | R19 | 7006 | N35 |
| 2704 | D15 | 3355 | N20 | 7007 | S35 |
| 2706 | D15 | 3356 | O21 | 7008 | F32 |
| 2707 | D16 | 3357 | P20 | 7009 | E34 |
| 2708 | D17 | 3362 | S3 | 7010 | C34 |
| 2709 | D17 | 3363 | S4 | 7011 | H33 |
| 2710 | D18 | 3364 | S3 | 7300 | N17 |
| 2712 | E16 | 3365 | S2 | 7301 | O4 |
| 2713 | E24 | 3366 | S10 | 7301 | N18 |
| 2717 | G16 | 3367 | R10 | 7302 | N20 |
| 2718 | G16 | 3368 | R10 | 7303 | T9 |
| 2719 | G16 | 3369 | S10 | 7303 | P20 |
| 2720 | G16 | 3370 | G9 | 7306 | P11 |
| 2721 | H16 | 3371 | G9 | 7307 | Q18 |
| 2723 | H16 | 3372 | G9 | 7308 | U7 |
| 2724 | H16 | 3376 | C10 | 7309 | S4 |
| 2725 | H16 | 3377 | B10 | 7310 | S12 |
| 2726 | H16 | 3378 | C11 | 7311 | S2 |
| 2728 | C28 | 3382 | G7 | 7312 | Q10 |
| 2729 | J15 | 3384 | C6 | 7320 | G9 |
| 2730 | I18 | 3385 | G8 | 7322 | F7 |
| 2731 | J15 | 3386 | S12 | 7323 | D9 |
| 2733 | K16 | 3387 | S13 | 7324 | T7 |
| 2738 | K16 | 3388 | Q11 | 7330 | T3 |
| 2743 | K16 | 3389 | Q10 | 7340 | N13 |
| 2747 | K17 | 3390 | Q10 | 7403 | H2 |
| 2748 | K18 | 3391 | S12 | 7407 | G6 |
| 2755 | C22 | 3392 | R11 | 7411 | E7 |
| 2756 | F16 | 3393 | F11 | 7701 | E16 |
| 2757 | D16 | 3394 | Q9 | 7702 | F17 |
| 2758 | F27 | 3395 | P4 | 7704 | I16 |
| 2759 | F27 | 3396 | P3 | 7708 | G27 |
| 2760 | F28 | 3397 | P3 | 7709 | F19 |
| 2761 | F28 | 3398 | P3 | 7713 | C16 |
| 2762 | F28 | 3399 | O13 | 7714 | B24 |
| 2763 | F28 | 3400 | B5 | 7715 | B26 |
| 2764 | F28 | 3406 | D2 | 7716 | C21 |
| 2765 | F28 | 3411 | G2 | 9310 | N20 |
| 2766 | J18 | 3414 | H3 | 9311 | O21 |
| 2767 | L22 | 3415 | C6 | | |
| 2770 | E15 | 3416 | E5 | | |
| 2771 | H18 | 3417 | E7 | | |
| 2772 | I18 | 3418 | D7 | | |
| 2773 | J18 | 3419 | E6 | | |
| 2774 | K25 | 3435 | G6 | | |
| 2776 | E21 | 3436 | E7 | | |
| 2785 | E23 | 3437 | E7 | | |
| 2786 | J25 | 3439 | G7 | | |
| 2788 | F25 | 3441 | C6 | | |
| 2790 | E28 | 3445 | G7 | | |
| 2792 | E25 | 3446 | G9 | | |
| 2795 | C17 | 3702 | K25 | | |
| 2796 | L20 | 3703 | G18 | | |
| 2797 | K26 | 3704 | E22 | | |
| 2798 | J18 | 3705 | G18 | | |

**B5**



**F**



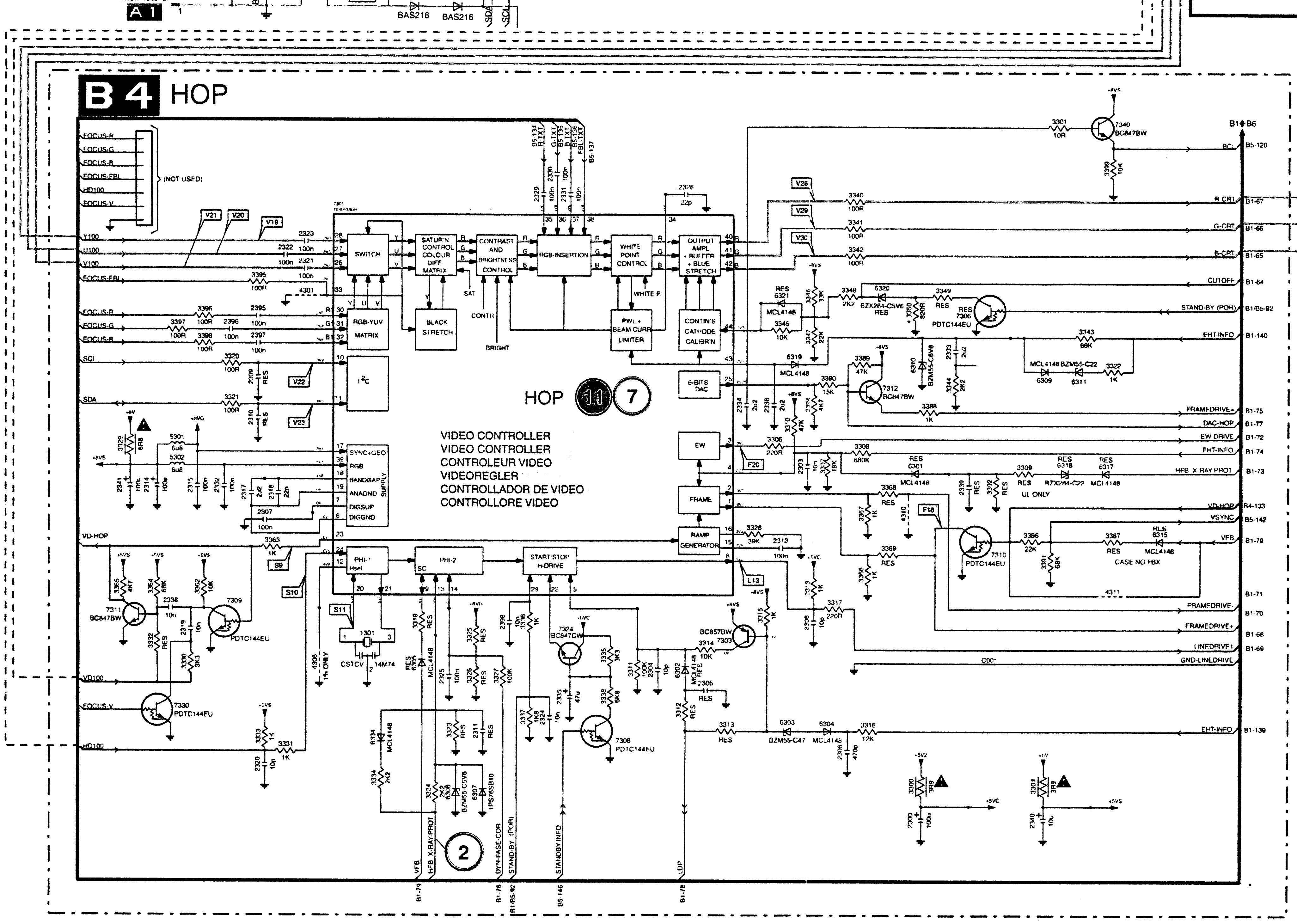
— IF, CVAS, RGB

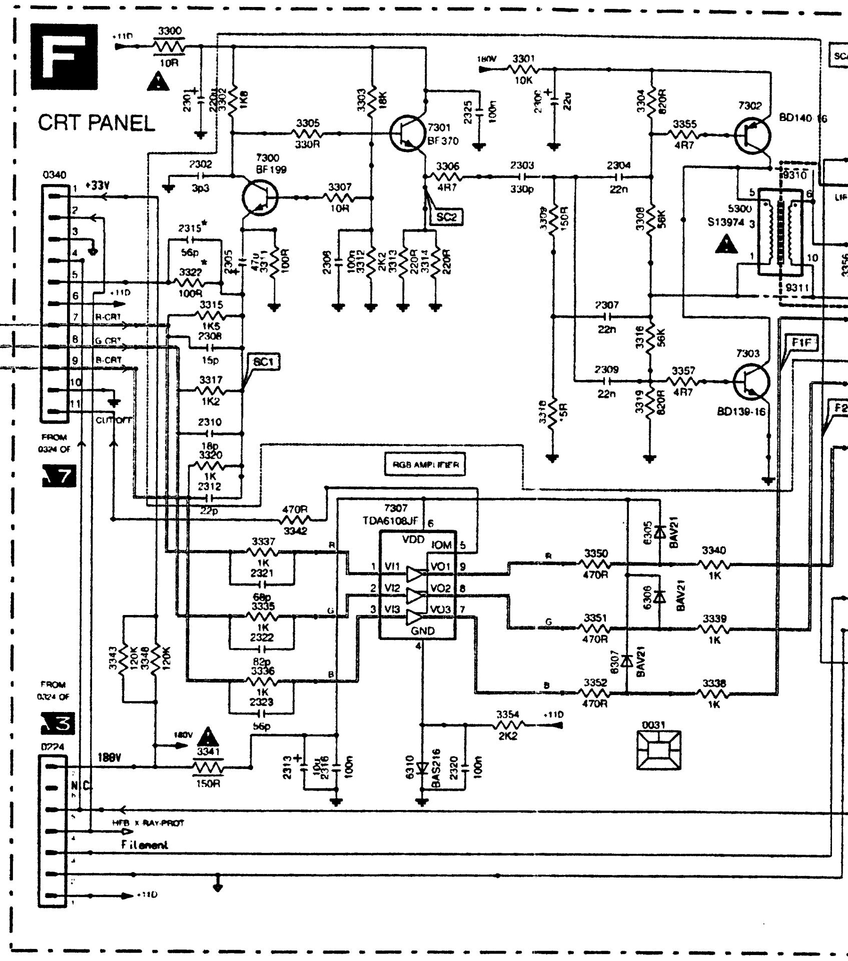
● PROTECTION ERROR

○ NON-PROTECTION ERROR

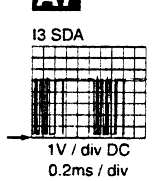
CL 96532156_092.eps
140400

0119b_zw-F1

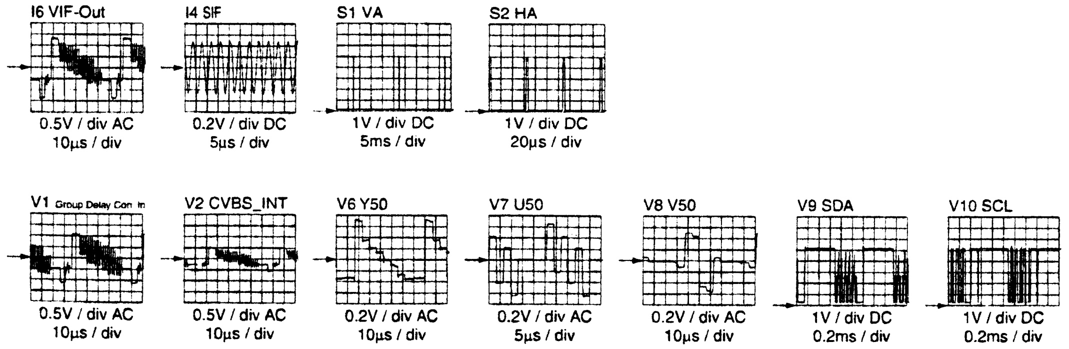

A1
BAS216
BAS216
SDA
SCL
B4 HOP
FOCUS-R
FOCUS-G
FOCUS-B
FOCUS-FBL
HD100
FOCUS-V
(NOT USED)
Y100
U100
V100
V21
V20
V19
SWITCH
SATUR'N CONTROL COLOUR DIFF MATRIX
CONTRAST AND BRIGHTNESS CONTROL
RGB-INSERTION
WHITE POINT CONTROL
OUTPUT AMPL + BUFFER + BLUE STRETCH
RGB-YUV MATRIX
BLACK STRETCH
PWL + BEAM CURR LIMITER
CONTIN'S CATHODE CALIBR'N
6-BITS DAC
EW
FRAME
RAMP GENERATOR
I²C
SYNC+GEO
RGB
BANDGAP
ANAGND
DIGSUP
DIGGND
SUPPLY
PHI-1 Hsel
PHI-2 SC
START/STOP H-DRIVE
HOP 11 7
VIDEO CONTROLLER
VIDEO CONTROLLER
CONTROLEUR VIDEO
VIDEOREGLER
CONTROLADOR DE VIDEO
CONTROLLORE VIDEO
SCL
SDA
VD-HOP
VD100
FOCUS-V
HD100
V22
V23
S9
S10
S11
F20
F18
L13
V28
V29
V30
7340 BC847BW
7311 BC847BW
7309 PDTC144EU
7330 PDTC144EU
7312 BC847BW
7306 PDTC144EU
7310 PDTC144EU
7324 BC847CW
7303 BC857BW
7308 PDTC144EU
1301 CSTCV 14M74
B1-B6
BC
B5-120
R-CRT B1-67
G-CRT B1-66
B-CRT B1-65
CUTOFF B1-64
STAND-BY (POR) B1/B5-92
EHT-INFO B1-140
FRAMEDRIVE- B1-75
DAC-HOP B1-77
EW DRIVE B1-72
EHT-INFO B1-74
HFB_X-RAY PROT B1-73
VD-HOP B4-133
VSYNC B5-142
VFB B1-79
B1-71
FRAMEDRIVE- B1-70
FRAMEDRIVE+ B1-68
LINEDRIVE1 B1-69
GND-LINEDRIVE
EHT-INFO B1-139
UI ONLY
CASE NO FBX
VFB
HFB_X-RAY PROT
DYN-FASE-COR
STAND-BY (POR)
STANDBY INFO
LDP
2
B1-79
B1-76
B1/B5-92
B5-146
B1-78
CONTR
BRIGHT
SAT
WHITE P


F
CRT PANEL
7300 BF199
7301 BF370
7302 BD140
7303 BD139
7307 TDA6108JF
RGB AMPLIFIER
VDD
IOM
VI1
VI2
VI3
VO1
VO2
VO3
GND
SC1
SC2
F1F
5300 S13974
9310
9311
0340
0224
FROM 0324 OF A7
FROM 0324 OF A3
+33V
180V
HFB X-RAY-PROT
Filament
+11D
BAV21
BAS216
0031

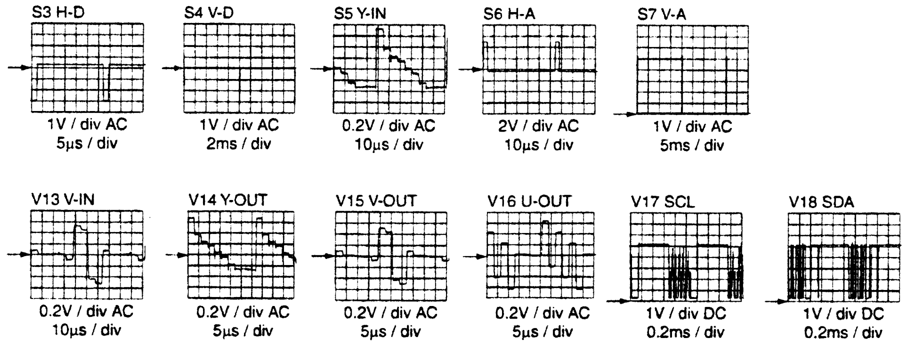
## A7


I3 SDA
1V / div DC
0.2ms / div

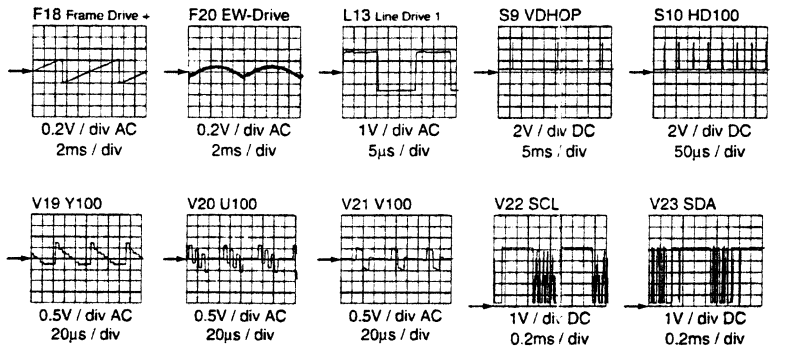
## B2


I6 VIF-Out
0.5V / div AC
10µs / div
I4 SIF
0.2V / div DC
5µs / div
S1 VA
1V / div DC
5ms / div
S2 HA
1V / div DC
20µs / div
V1 Group Delay Con In
0.5V / div AC
10µs / div
V2 CVBS_INT
0.5V / div AC
10µs / div
V6 Y50
0.2V / div AC
10µs / div
V7 U50
0.2V / div AC
5µs / div
V8 V50
0.2V / div AC
10µs / div
V9 SDA
1V / div DC
0.2ms / div
V10 SCL
1V / div DC
0.2ms / div

## B3


S3 H-D
1V / div AC
5µs / div
S4 V-D
1V / div AC
2ms / div
S5 Y-IN
0.2V / div AC
10µs / div
S6 H-A
2V / div AC
10µs / div
S7 V-A
1V / div AC
5ms / div
V13 V-IN
0.2V / div AC
10µs / div
V14 Y-OUT
0.2V / div AC
5µs / div
V15 V-OUT
0.2V / div AC
5µs / div
V16 U-OUT
0.2V / div AC
5µs / div
V17 SCL
1V / div DC
0.2ms / div
V18 SDA
1V / div DC
0.2ms / div

## B4


F18 Frame Drive +
0.2V / div AC
2ms / div
F20 EW-Drive
0.2V / div AC
2ms / div
L13 Line Drive 1
1V / div AC
5µs / div
S9 VDHOP
2V / div DC
5ms / div
S10 HD100
2V / div DC
50µs / div
V19 Y100
0.5V / div AC
20µs / div
V20 U100
0.5V / div AC
20µs / div
V21 V100
0.5V / div AC
20µs / div
V22 SCL
1V / div DC
0.2ms / div
V23 SDA
1V / div DC
0.2ms / div

**Colour Television** **Chassis**

# EM2E

## AA 02.01

Service
Service
Service

# Service Information

## GB Changes in Course of Production

**INTRODUCTION ANTI-MOIRÉ PANEL**
From production start onwards, an anti-moiré panel was introduced in the 29" 4:3 Real Flat sets with Philips CRT. This anti-moiré circuitry is combined with the DC-shift panel (assy 12nc is 3104 328 16661).

Involved sets:
- 29PT9007.
- 29PT9047.

Circuit diagram (G), layouts and partslist are published.

**INTRODUCTION OF NEW SSB PANEL**
During production, a new SSB panel is introduced. The layout of the copper pattern has been changed to version 8. Below, you will find the most important changes.

**Diagram B4 (HOP):**
- A new dimensioning of the HOP slow-start circuit (items 3335, 3338 and 2335).
- A new flash circuit (items 6313 and 6314 are added) around the HOP (diagram B4).

**Diagram B5 (OTC):**
- A new flash reset circuitry is added, to prevent NVM overwriting.
- To solve TXT-jitter, two transistors (7012 and 7013) were added, to improve the steepness of the $H_{SYNC}$ and $V_{SYNC}$ pulses. This change is implemented together with new software.

Circuit diagrams (B4 and B5), layouts and partslist are published.

## D Änderungen bei der Produktion

**EINFÜHRUNG DES ANTI-MOIRÉ-PANELS**
Seit Beginn der Produktion enthalten die 29" 4:3 Real Flat Geräte mit Philips Kathodenstrahlröhre ein Anti-Moiré Panel. Diese Anti-Moiré Schaltung wird mit dem Gleichstromänderungs-Panel (Assy 12nc ist 3104 328 16661) kombiniert.

Betroffene Geräte:
- 29PT9007.
- 29PT9047.

Der Schaltplan (G), die Layouts und die Teileliste wurden veröffentlicht.

**EINFÜHRUNG DES NEUEN SSB-PANELS**
Während der Produktion wird das neue Klein Signal Platine (SSB-Panel) eingeführt. Das Layout der Kupferstruktur wurde zu Version 8 geändert. Nachstehend werden die wichtigsten Änderungen beschrieben

**Schaltplan B4 (HOP):**
- Eine neue Dimension von HOP Slow Start Schaltungen (Teile 3335, 3338 und 2335).
- Eine neue Flash-Schaltung um den HOP (Teile 6313 und 6314 werden hinzugefügt). (Schaltplan B4)

**Schaltplan B5 (OTC):**
- Es wird eine neue Rückstell Schaltung für den Flash-Speicher hinzugefügt, um das Überschreiben des nicht-flüchtigen Speichers zu verhindern.
- Um TXT-Bildschwankungen zu beheben, wurden zur Verbesserung der Steilheit der Impulse HSYNC und VSYNC zwei Transistoren (7012 und 7013) hinzugefügt. Diese Änderung wird zusammen mit neuer Software implementiert.

Die Schaltpläne (B4 und B5), die Layouts und die Teileliste wurden veröffentlicht.

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PHILIPS

## (F) Modifications en cours de production

**INTRODUCTION D'UNE PLATINE ANTI-MOIRÉ**
Une platine anti-moiré a été introduite dans les postes 4:3 Real Flat de 29" équipés d'un tube cathodique Philips depuis le début de la production. Ce circuit anti-moiré est combiné à la platine à décalage CC réglable (réf. 12nc 3104 328 16661).

Postes concernés :
- 29PT9007.
- 29PT9047.

Les schémas de câblage, tracés et listes de pièces correspondants sont publiés.

**INTRODUCTION D'UNE NOUVELLE PLATINE PETITS SIGNAUX**
Une nouvelle platine petits signaux (SSB) a été introduite au cours de la production. Le tracé des pistes de cuivre a été modifié et correspond maintenant à la version 8. Les plus importantes modifications sont notées ci-dessous.

**Schéma B4 (HOP)**
- Le circuit HOP à démarrage lent a été redimensionné (éléments 3335, 3338 et 2335).
- Un nouveau circuit flash (les éléments 6313 et 6314 ont été ajoutés) a été disposé autour du processeur HOP (schéma B4).

**Schéma B5 (OTC)**
- Un nouveau circuit de réinitialisation flash a été ajouté afin d'empêcher l'écrasement de la mémoire non volatile (NVM).
- Pour résoudre le problème d'instabilité horizontale de l'image texte, deux transistors (7012 et 7013) ont été ajoutés afin d'améliorer la raideur des impulsions HSYNC et VSYNC. Cette modification est mise en œuvre conjointement avec le nouveau logiciel.

Les schémas de câblage (B4 et B5), tracés et listes de pièces correspondants sont publiés.

## (E) Cambios durante la producción

**INTRODUCCIÓN DEL PANEL ANTI-MOIRÉ**
Desde que se ha iniciado la producción, se ha introducido un panel anti-moiré en los equipos de 29" 4:3 Real Flat con TRC de Philips. Esta circuitería anti-moiré se combina con el panel de desplazamiento de C.C. (el código 12NC del conjunto es 3104 328 16661).

Equipos implicados:
- 29PT9007.
- 29PT9047.

Se publican el diagrama de circuitos (G), esquemas y listas de piezas.

**INTRODUCCIÓN DEL NUEVO PANEL SSB**
Durante la producción, se ha introducido un nuevo panel SSB. El esquema del patrón de pistas de cobre ha cambiado a la versión 8. A continuación encontrará los cambios más importantes.

**Diagrama B4 (HOP):**
- Nuevo dimensionamiento de la circuitería de arranque lento del HOP (elementos 3335, 3338 y 2335).
- Nuevo circuito flash (se agregan los elementos 6313 y 6314) alrededor del HOP (diagrama B4).

**Diagrama B5 (OTC):**
- Se ha agregado una nueva circuitería flash de reset para evitar la sobrescritura de la NVM.
- Para solucionar el problema del temblor (jitter) de TXT, se han agregado dos transistores (7012 y 7013) para mejorar la pendiente de los pulsos HSYNC y VSYNC. Este cambio se ha implantado conjuntamente con el nuevo software.

Se publican los diagramas (B4 y B5), esquemas y listas de piezas.

## I Modifiche in corso di produzione

**INRODUZIONE DI UN PANNELLO ANTI-MOIRÉ**
A partire dalla produzione in poi, è stato introdotto un pannello anti-moiré negli apparecchi 29" 4:3 Real Flat con CRT Philips. Questo circuito anti-moiré è associato ad un pannello di deviazione in C.C. (l'assemblaggio 12nc è 3104 328 16661).

Apparecchi interessati:

- 29PT9007.
- 29PT9047.

Schemi dei circuiti (G), layout ed elenco parti di ricambio sono pubblicati.

**INTRODUZIONE DEL NUOVO PANNELLO SSB**
Durante la produzione, viene introdotto un nuovo pannello SSB. Il layout del modello in rame è stato cambiato nella versione 8. Qui di seguito vengono elencate le modifiche più importanti.

**Schema B4 (HOP):**

- Nuovo dimensionamento del circuito HOP ad avvio ritardato (art. 3335, 3338 e 2335).
- Nuovo circuito flash (aggiunti gli art. 6313 e 6314) attorno all' HOP (schema B4).

**Schema B5 (OTC):**

- È stato aggiunto un nuovo circuito di flash reset per impedire la sovrascrittura NVM.
- Per risolvere il tremolio TXT, sono stati aggiunti due transistori (7012 e 7013), in modo da migliorare la ripidezza degli impulsi HSYNC e VSYNC. Questa modifica è stata implementata assieme al nuovo software.

Schemi del circuiti (B4 e B5), layout ed elenco parti di ricambio sono pubblicati.

# Spare Parts List

## Small Signal Panel [B]

### Various

| | | |
|---|---|---|
| 0302 | 2422 025 16542 | CON 2P Male |
| 1001 | 2422 543 89022 | XTL 6MHz 20pF |
| 1301 | 2422 540 98456 | CER RES 12MHz |
| 1305 | 2422 543 01184 | XTL 4M433619 20pF |
| 1308 | 2422 543 01158 | XTL 3M579545 7pF |
| 1407 | 2422 549 44324 | FIL CER 5M5/5M74 |
| 1408 | 2422 549 44372 | FIL SAW 38.9MHz OFWK3953L |
| 1409 | 2422 549 44369 | FIL SAW 38.9MHz OFWK9656L |
| 1651 | 2422 543 89019 | XTL 18M432 12pF |
| 1701 | 2422 543 89018 | XTL 12MHz 20pF |

### ⊣⊢

| | | |
|---|---|---|
| 2001 | 2222 867 15339 | 33pF 5% 50V |
| 2002 | 4822 126 11669 | 27pF |
| 2003 | 4822 126 13879 | 220nF 20% 16V |
| 2004 | 4822 126 13879 | 220nF 20% 16V |
| 2005 | 4822 126 14305 | 100nF 10% 16V |
| 2006 | 4822 126 14305 | 100nF 10% 16V |
| 2007 | 4822 126 14305 | 100nF 10% 16V |
| 2008 | 4822 126 14305 | 100nF 10% 16V |
| 2010 | 4822 122 33777 | 47pF 5% 63V |
| 2011 | 4822 122 33777 | 47pF 5% 63V |
| 2012 | 4822 122 33777 | 47pF 5% 63V |
| 2013 | 4822 124 12095 | 100µF 20% 16V |
| 2014 | 4822 126 14305 | 100nF 10% 16V |
| 2015 | 4822 126 14305 | 100nF 10% 16V |
| 2016 | 2020 021 91557 | 100µF 20% 16V |
| 2017 | 4822 126 14305 | 100nF 10% 16V |
| 2019 | 4822 126 14305 | 100nF 10% 16V |
| 2020 | 4822 126 13883 | 220pF 5% 50V |
| 2022 | 4822 126 14305 | 100nF 10% 16V |
| 2023 | 4822 126 14305 | 100nF 10% 16V |
| 2024 | 4822 126 14305 | 100nF 10% 16V |
| 2025 | 4822 126 14305 | 100nF 10% 16V |
| 2026 | 4822 126 14305 | 100nF 10% 16V |
| 2027 | 4822 126 14305 | 100nF 10% 16V |
| 2028 | 4822 126 14305 | 100nF 10% 16V |
| 2029 | 4822 126 14305 | 100nF 10% 16V |
| 2031 | 4822 126 14305 | 100nF 10% 16V |
| 2032 | 4822 126 14305 | 100nF 10% 16V |
| 2033 | 4822 126 14226 | 82pF 5% 50V |
| 2034 | 4822 126 14226 | 82pF 5% 50V |
| 2035 | 4822 126 14226 | 82pF 5% 50V |
| 2036 | 4822 126 14226 | 82pF 5% 50V |
| 2037 | 4822 126 14226 | 82pF 5% 50V |
| 2038 | 4822 126 14305 | 100nF 10% 16V |
| 2039 | 4822 126 14305 | 100nF 10% 16V |
| 2300 | 4822 124 12095 | 100µF 20% 16V |
| 2303 | 5322 126 11583 | 10nF 10% 50V |
| 2304 | 4822 122 33741 | 10pF 10% 50V |
| 2306 | 4822 126 13881 | 470pF 5% 50V |
| 2307 | 4822 126 14305 | 100nF 10% 16V |
| 2308 | 4822 122 33741 | 10pF 10% 50V |
| 2313 | 4822 121 70159 | 0.1µF 16V |
| 2314 | 4822 124 12095 | 100µF 20% 16V |
| 2315 | 4822 126 14305 | 100nF 10% 16V |
| 2317 | 4822 126 14491 | 2.2µF 10V |
| 2318 | 4822 126 14494 | 22nF 10% 25V |
| 2319 | 5322 126 11583 | 10nF 10% 50V |
| 2320 | 4822 122 33741 | 10pF 10% 50V |
| 2321 | 4822 126 14305 | 100nF 10% 16V |
| 2322 | 4822 126 14305 | 100nF 10% 16V |
| 2323 | 4822 126 14305 | 100nF 10% 16V |
| 2324 | 5322 126 11583 | 10nF 10% 50V |
| 2325 | 4822 126 14305 | 100nF 10% 16V |
| 2328 | 4822 122 33761 | 22pF 5% 50V |
| 2329 | 4822 126 14305 | 100nF 10% 16V |
| 2330 | 4822 126 14305 | 100nF 10% 16V |
| 2331 | 4822 126 14305 | 100nF 10% 16V |
| 2332 | 4822 126 14305 | 100nF 10% 16V |
| 2333 | 4822 126 14491 | 2.2µF 10V |
| 2334 | 4822 126 14491 | 2.2µF 10V |
| 2335 | 4822 124 12095 | 100µF 20% 16V |
| 2336 | 4822 126 14491 | 2.2µF 10V |
| 2338 | 5322 126 11583 | 10nF 10% 50V |
| 2340 | 4822 124 23002 | 10µF 16V |
| 2341 | 4822 124 12095 | 100µF 20% 16V |
| 2350 | 4822 126 14305 | 100nF 10% 16V |
| 2351 | 4822 126 14305 | 100nF 10% 16V |
| 2352 | 4822 126 14305 | 100nF 10% 16V |
| 2356 | 4822 126 14305 | 100nF 10% 16V |
| 2357 | 4822 126 14305 | 100nF 10% 16V |
| 2358 | 5322 126 11579 | 3.3nF 10% 63V |
| 2359 | 4822 122 33752 | 15pF 5% 50V |
| 2360 | 3198 016 33380 | 3.3pF 50V |
| 2361 | 3198 016 31580 | 1.5pF 50V |
| 2362 | 4822 126 11663 | 12pF |
| 2365 | 4822 126 14305 | 100nF 10% 16V |
| 2366 | 4822 126 14305 | 100nF 10% 16V |
| 2367 | 4822 126 14305 | 100nF 10% 16V |
| 2368 | 4822 126 14305 | 100nF 10% 16V |
| 2369 | 4822 126 14305 | 100nF 10% 16V |
| 2370 | 4822 126 14305 | 100nF 10% 16V |
| 2371 | 4822 126 13193 | 4.7nF 10% 63V |
| 2372 | 4822 126 14043 | 1µF 20% 16V |
| 2373 | 4822 126 14305 | 100nF 10% 16V |
| 2374 | 4822 126 14491 | 2.2µF 10V |
| 2375 | 4822 126 14494 | 22nF 10% 25V |
| 2376 | 4822 126 14305 | 100nF 10% 16V |
| 2377 | 4822 124 12095 | 100µF 20% 16V |
| 2378 | 4822 126 14305 | 100nF 10% 16V |
| 2384 | 4822 126 14305 | 100nF 10% 16V |
| 2406 | 4822 126 13883 | 220pF 5% 50V |
| 2407 | 4822 126 13956 | 68pF 5% 63V |
| 2408 | 3198 016 32780 | 2.7pF 50V |
| 2409 | 4822 126 14491 | 2.2µF 10V |
| 2410 | 4822 126 14472 | 1µF 10% 10V |
| 2411 | 4822 126 14305 | 100nF 10% 16V |
| 2412 | 4822 126 13193 | 4.7nF 10% 63V |
| 2413 | 4822 124 80151 | 47µF 16V |
| 2417 | 3198 017 44740 | 0603 10V 470nF |
| 2418 | 4822 126 13956 | 68pF 5% 63V |
| 2420 | 4822 122 33753 | 150pF 5% 50V |
| 2501 | 4822 122 33777 | 47pF 5% 63V |
| 2502 | 4822 122 32927 | 220nF 20% 50V |
| 2503 | 4822 122 32927 | 220nF 20% 50V |
| 2504 | 4822 122 32927 | 220nF 20% 50V |
| 2505 | 4822 122 32927 | 220nF 20% 50V |
| 2508 | 2020 021 91557 | 100µF 20% 16V |
| 2546 | 4822 124 23002 | 10µF 16V |
| 2547 | 4822 124 23002 | 10µF 16V |
| 2548 | 4822 124 23002 | 10µF 16V |
| 2549 | 4822 124 23002 | 10µF 16V |
| 2550 | 4822 126 14241 | 330pF 50V |
| 2551 | 5322 126 11579 | 3.3nF 10% 63V |
| 2609 | 3198 016 31020 | 1nF 25V |
| 2610 | 4822 126 14238 | 2.2nF 50V |
| 2611 | 5322 126 11578 | 1nF 10% 50V |
| 2629 | 4822 122 32927 | 220nF 20% 50V |
| 2637 | 4822 122 32927 | 220nF 20% 50V |
| 2640 | 4822 126 13879 | 220nF 20% 16V |
| 2651 | 4822 126 14305 | 100nF 10% 16V |
| 2652 | 4822 122 33777 | 47pF 5% 63V |
| 2653 | 4822 122 32927 | 220nF 20% 50V |
| 2654 | 4822 126 13881 | 470pF 5% 50V |
| 2655 | 4822 126 13881 | 470pF 5% 50V |
| 2656 | 4822 126 13881 | 470pF 5% 50V |
| 2657 | 4822 126 13881 | 470pF 5% 50V |
| 2658 | 4822 126 13881 | 470pF 5% 50V |
| 2661 | 4822 122 32927 | 220nF 20% 50V |
| 2662 | 4822 122 32927 | 220nF 20% 50V |
| 2663 | 4822 126 13881 | 470pF 5% 50V |
| 2664 | 4822 126 13881 | 470pF 5% 50V |
| 2665 | 4822 124 12095 | 100µF 20% 16V |
| 2666 | 4822 124 12095 | 100µF 20% 16V |
| 2667 | 3198 016 33380 | 3.3pF 50V |
| 2668 | 3198 016 33380 | 3.3pF 50V |
| 2669 | 4822 124 23002 | 10µF 16V |
| 2670 | 5322 126 11583 | 10nF 10% 50V |
| 2673 | 3198 016 31020 | 1nF 25V |
| 2674 | 3198 016 31020 | 1nF 25V |
| 2675 | 4822 124 23002 | 10µF 16V |
| 2677 | 2020 021 91554 | 10µF 20% 16V |
| 2678 | 2020 021 91554 | 10µF 20% 16V |
| 2679 | 4822 126 14305 | 100nF 10% 16V |
| 2680 | 2020 021 91554 | 10µF 20% 16V |
| 2681 | 4822 126 14305 | 100nF 10% 16V |
| 2682 | 2020 021 91554 | 10µF 20% 16V |
| 2685 | 3198 016 31020 | 0603 25V 1nF |
| 2686 | 3198 016 31020 | 0603 25V 1nF |
| 2690 | 4822 126 14305 | 100nF 10% 16V |
| 2691 | 4822 126 14305 | 100nF 10% 16V |
| 2693 | 4822 126 13883 | 220pF 5% 50V |
| 2702 | 2020 021 91554 | 10µF 20% 16V |
| 2703 | 4822 126 14305 | 100nF 10% 16V |
| 2704 | 2020 021 91554 | 10µF 20% 16V |
| 2706 | 2020 021 91557 | 100µF 20% 16V |
| 2707 | 4822 126 14305 | 100nF 10% 16V |
| 2708 | 2020 021 91554 | 10µF 20% 16V |
| 2709 | 4822 126 14305 | 100nF 10% 16V |
| 2710 | 2020 021 91554 | 10µF 20% 16V |
| 2712 | 2020 021 91554 | 10µF 20% 16V |
| 2713 | 4822 126 14305 | 100nF 10% 16V |
| 2717 | 4822 126 14218 | 3.9pF 50V |
| 2718 | 4822 126 11669 | 27pF |
| 2719 | 4822 126 11663 | 12pF |
| 2720 | 4822 126 14218 | 3.9pF 50V |
| 2721 | 4822 126 11669 | 27pF |
| 2723 | 4822 126 11663 | 12pF |
| 2724 | 4822 126 14218 | 3.9pF 50V |
| 2725 | 4822 126 11669 | 27pF |
| 2726 | 4822 126 11663 | 12pF |
| 2728 | 4822 126 14305 | 100nF 10% 16V |
| 2729 | 4822 126 14225 | 56pF 5% 50V |
| 2730 | 4822 126 14494 | 22nF 10% 25V |
| 2731 | 4822 122 31765 | 100pF 2% 63V 1206 |
| 2733 | 4822 126 14494 | 22nF 10% 25V |
| 2738 | 4822 126 14494 | 22nF 10% 25V |
| 2743 | 4822 126 14494 | 22nF 10% 25V |
| 2747 | 4822 126 14507 | 18pF 5% 50V |
| 2748 | 4822 126 14507 | 18pF 5% 50V |
| 2755 | 4822 126 14305 | 100nF 10% 16V |
| 2756 | 4822 126 14305 | 100nF 10% 16V |
| 2757 | 2020 021 91554 | 10µF 20% 16V |
| 2758 | 4822 126 14305 | 100nF 10% 16V |
| 2759 | 4822 126 14305 | 100nF 10% 16V |
| 2760 | 4822 126 14305 | 100nF 10% 16V |
| 2761 | 4822 126 14305 | 100nF 10% 16V |
| 2762 | 4822 126 14305 | 100nF 10% 16V |
| 2763 | 4822 126 14305 | 100nF 10% 16V |
| 2764 | 4822 126 14305 | 100nF 10% 16V |
| 2765 | 4822 126 14305 | 100nF 10% 16V |
| 2766 | 4822 126 14305 | 100nF 10% 16V |
| 2767 | 4822 126 14305 | 100nF 10% 16V |
| 2770 | 4822 126 14305 | 100nF 10% 16V |
| 2771 | 4822 126 14305 | 100nF 10% 16V |
| 2772 | 4822 126 14305 | 100nF 10% 16V |
| 2773 | 3198 016 31020 | 0603 25V 1nF |
| 2774 | 4822 126 14305 | 100nF 10% 16V |
| 2776 | 4822 126 14305 | 100nF 10% 16V |
| 2785 | 4822 126 14305 | 100nF 10% 16V |
| 2786 | 4822 126 14305 | 100nF 10% 16V |
| 2788 | 4822 126 14305 | 100nF 10% 16V |
| 2790 | 4822 126 14305 | 100nF 10% 16V |
| 2792 | 4822 126 14305 | 100nF 10% 16V |
| 2795 | 4822 126 14305 | 100nF 10% 16V |
| 2796 | 4822 126 14305 | 100nF 10% 16V |
| 2798 | 3198 016 36810 | 680pF 25V |
| 2902 | 5322 126 11583 | 10nF 10% 50V |
| 2908 | 4822 126 13883 | 220pF 5% 50V |
| 2909 | 4822 126 13883 | 220pF 5% 50V |
| 2910 | 4822 126 13883 | 220pF 5% 50V |
| 2911 | 4822 126 13883 | 220pF 5% 50V |
| 2912 | 4822 126 13883 | 220pF 5% 50V |
| 2913 | 4822 126 13883 | 220pF 5% 50V |
| 2914 | 4822 126 13883 | 220pF 5% 50V |
| 2915 | 4822 126 13883 | 220pF 5% 50V |
| 2916 | 4822 126 13883 | 220pF 5% 50V |
| 2917 | 4822 126 13883 | 220pF 5% 50V |

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| 3001 | 4822 051 30472 | 4k7 5% 0.062W |
| 3002 | 4822 051 30472 | 4k7 5% 0.062W |
| 3003 | 4822 117 13525 | 24k 1% 0.62W |
| 3006 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3007 | 3198 031 14710 | 4 X 470Ω PM5 |
| 3008 | 4822 117 13526 | 150Ω 5% 0.63W |
| 3009 | 4822 051 30689 | 68Ω 5% 0.063W |
| 3011 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3012 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3013 | 4822 051 30103 | 10k 5% 0.062W |
| 3014 | 4822 051 30682 | 6k8 5% 0.062W |
| 3015 | 4822 051 30474 | 470k 5% 0.062W |
| 3016 | 4822 051 30152 | 1k5 5% 0.062W |
| 3017 | 4822 051 30472 | 4k7 5% 0.062W |
| 3018 | 4822 051 30103 | 10k 5% 0.062W |
| 3019 | 4822 051 30472 | 4k7 5% 0.062W |
| 3020 | 4822 051 30103 | 10k 5% 0.062W |
| 3021 | 4822 051 30103 | 10k 5% 0.062W |
| 3023 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3024 | 4822 051 30273 | 27k 5% 0.062W |
| 3025 | 4822 051 30221 | 220Ω 5% 0.062W |
| 3026 | 4822 051 30103 | 10k 5% 0.062W |
| 3027 | 4822 117 12925 | 47k 1% 0.063W |
| 3028 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3029 | 4822 051 30103 | 10k 5% 0.062W |
| 3030 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3031 | 4822 051 30103 | 10k 5% 0.062W |

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|---|---|---|
| 3032 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3033 | 4822 051 30103 | 10k 5% 0.062W |
| 3034 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3035 | 3198 031 11010 | 4 X 100Ω PM5 |
| 3039 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3040 | 4822 051 30103 | 10k 5% 0.062W |
| 3041 | 4822 051 30562 | 5k6 5% 0.062W |
| 3044 | 3198 031 14720 | 4 X 4k7 PM5 |
| 3058 | 4822 051 30682 | 6k8 5% 0.062W |
| 3059 | 2322 704 66201 | 620Ω PM1 |
| 3060 | 4822 051 30103 | 10k 5% 0.062W |
| 3061 | 4822 051 30103 | 10k 5% 0.062W |
| 3062 | 4822 051 30103 | 10k 5% 0.062W |
| 3064 | 3198 031 11010 | 4 X 100Ω PM5 |
| 3073 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3074 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3075 | 4822 051 30103 | 10k 5% 0.062W |
| 3076 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3077 | 4822 051 30272 | 2k7 5% 0.062W |
| 3078 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3079 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3080 | 4822 051 30472 | 4k7 5% 0.062W |
| 3081 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3083 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3084 | 4822 051 30103 | 10k 5% 0.062W |
| 3085 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3086 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3087 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3088 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3089 | 4822 117 12925 | 47k 1% 0.063W |
| 3090 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3091 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3092 | 4822 051 30221 | 220Ω 5% 0.062W |
| 3095 | 4822 051 30008 | 0Ω jumper |
| 3097 | 4822 051 30474 | 470k 5% 0.062W |
| 3098 | 4822 051 30472 | 4k7 5% 0.062W |
| 3099 | 4822 117 12925 | 47k 1% 0.063W |
| 3300 | 2322 750 63908 | 3Ω9 PM5 |
| 3301 | 4822 051 30109 | 10Ω 5% 0.062W |
| 3304 | 2322 750 63908 | 3Ω9 PM5 |
| 3306 | 4822 051 30221 | 220Ω 5% 0.062W |
| 3307 | 4822 051 30183 | 18k 5% 0.062W |
| 3308 | 4822 051 30684 | 680k 5% 0.062W |
| 3310 | 4822 117 12925 | 47k 1% 0.063W |
| 3311 | 4822 117 13632 | 100k 1% 0.62W |
| 3314 | 4822 051 30103 | 10k 5% 0.062W |
| 3315 | 4822 051 30102 | 1k 5% 0.062W |
| 3316 | 4822 051 30123 | 12k 5% 0.062W |
| 3317 | 4822 051 30221 | 220Ω 5% 0.062W |
| 3318 | 4822 051 30102 | 1k 5% 0.062W |
| 3320 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3321 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3322 | 4822 051 10102 | 1k 2% 0.25W |
| 3324 | 4822 051 30222 | 2k2 5% 0.062W |
| 3327 | 4822 117 13632 | 100k 1% 0.62W |
| 3328 | 4822 051 30393 | 39k 5% 0.062W |
| 3329 | 4822 117 13568 | 6Ω8 5% 1206 |
| 3330 | 4822 051 30332 | 3k3 5% 0.062W |
| 3331 | 4822 051 30102 | 1k 5% 0.062W |
| 3333 | 4822 051 30102 | 1k 5% 0.062W |
| 3334 | 4822 051 30102 | 1k 5% 0.062W |
| 3335 | 4822 117 12903 | 1k8 1% 0.063W |
| 3336 | 4822 051 30102 | 1k 5% 0.062W |
| 3337 | 4822 117 12903 | 1k8 1% 0.063W |
| 3338 | 4822 051 30392 | 3k9 5% 0.063W |
| 3340 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3341 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3342 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3343 | 4822 051 30683 | 68k 5% 0.062W |
| 3344 | 4822 051 30222 | 2k2 5% 0.062W |
| 3345 | 4822 051 30103 | 10k 5% 0.062W |
| 3346 | 4822 051 30333 | 33k 5% 0.062W |
| 3347 | 4822 051 30223 | 22k 5% 0.062W |
| 3348 | 4822 051 30222 | 2k2 5% 0.062W |
| 3361 | 4822 051 30151 | 150Ω 5% 0.062W |
| 3362 | 4822 051 30103 | 10k 5% 0.062W |
| 3363 | 4822 051 30102 | 1k 5% 0.062W |
| 3364 | 4822 051 30683 | 68k 5% 0.062W |
| 3365 | 4822 051 30472 | 4k7 5% 0.062W |
| 3366 | 4822 051 30102 | 1k 5% 0.062W |
| 3367 | 4822 051 30102 | 1k 5% 0.062W |
| 3370 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3371 | 4822 051 30479 | 47Ω 5% 0.062W |
| 3372 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3376 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3377 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3378 | 4822 051 30153 | 15k 5% 0.062W |
| 3382 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3384 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3385 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3386 | 4822 051 30223 | 22k 5% 0.062W |
| 3388 | 4822 051 30681 | 680Ω 5% 0.062W |
| 3389 | 4822 117 12925 | 47k 1% 0.063W |
| 3390 | 4822 051 30183 | 18k 5% 0.062W |
| 3391 | 4822 051 30683 | 68k 5% 0.062W |
| 3393 | 4822 117 13632 | 100k 1% 0.62W |
| 3394 | 4822 051 30472 | 4k7 5% 0.062W |
| 3400 | 4822 117 11152 | 4Ω7 5% |
| 3406 | 4822 051 30479 | 47Ω 5% 0.062W |
| 3411 | 4822 051 30472 | 4k7 5% 0.062W |
| 3414 | 4822 051 30472 | 4k7 5% 0.062W |
| 3415 | 4822 051 30222 | 2k2 5% 0.062W |
| 3416 | 4822 117 13568 | 6Ω8 5% 1206 |
| 3418 | 4822 051 30391 | 390Ω 5% 0.062W |
| 3419 | 4822 051 30759 | 75Ω 5% 0.062W |
| 3435 | 4822 051 30472 | 4k7 5% 0.062W |
| 3436 | 4822 051 30221 | 220Ω 5% 0.062W |
| 3437 | 4822 051 30102 | 1k 5% 0.062W |
| 3439 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3441 | 4822 051 30103 | 10k 5% 0.062W |
| 3445 | 4822 051 30471 | 470Ω 5% 0.062W |
| 3446 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3532 | 4822 051 30102 | 1k 5% 0.062W |
| 3533 | 4822 051 30103 | 10k 5% 0.062W |
| 3540 | 4822 051 30103 | 10k 5% 0.062W |
| 3550 | 4822 051 30102 | 1k 5% 0.062W |
| 3551 | 4822 051 30102 | 1k 5% 0.062W |
| 3610 | 4822 117 12925 | 47k 1% 0.063W |
| 3611 | 4822 117 12925 | 47k 1% 0.063W |
| 3612 | 4822 117 12925 | 47k 1% 0.063W |
| 3613 | 4822 117 12925 | 47k 1% 0.063W |
| 3614 | 4822 117 12925 | 47k 1% 0.063W |
| 3615 | 4822 117 12925 | 47k 1% 0.063W |
| 3621 | 4822 051 30105 | 1M 5% 0.062W |
| 3637 | 4822 051 30105 | 1M 5% 0.062W |
| 3653 | 4822 051 30008 | 0Ω jumper |
| 3654 | 4822 051 30008 | 0Ω jumper |
| 3655 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3656 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3658 | 4822 051 30334 | 330k 5% 0.062W |
| 3660 | 4822 051 30334 | 330k 5% 0.062W |
| 3662 | 3198 017 31530 | 15nF 50V |
| 3673 | 4822 051 30472 | 4k7 5% 0.062W |
| 3680 | 3198 017 31530 | 15nF 50V |
| 3683 | 4822 051 30272 | 2k7 5% 0.062W |
| 3684 | 4822 051 30008 | 0Ω jumper |
| 3685 | 4822 051 30008 | 0Ω jumper |
| 3688 | 4822 051 30008 | 0Ω jumper |
| 3689 | 4822 051 30008 | 0Ω jumper |
| 3702 | 4822 117 12139 | 22Ω 5% 0.062W |
| 3703 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3705 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3706 | 4822 051 30109 | 10Ω 5% 0.062W |
| 3707 | 4822 051 30392 | 3k9 5% 0.063W |
| 3708 | 4822 051 30272 | 2k7 5% 0.062W |
| 3709 | 4822 051 30008 | 0Ω jumper |
| 3710 | 4822 051 30391 | 390Ω 5% 0.062W |
| 3711 | 4822 051 30102 | 1k 5% 0.062W |
| 3712 | 4822 051 30391 | 390Ω 5% 0.062W |
| 3713 | 4822 051 30391 | 390Ω 5% 0.062W |
| 3714 | 4822 117 12139 | 22Ω 5% 0.062W |
| 3716 | 4822 051 30472 | 4k7 5% 0.062W |
| 3717 | 4822 051 30472 | 4k7 5% 0.062W |
| 3718 | 4822 051 30221 | 220Ω 5% 0.062W |
| 3719 | 4822 117 13574 | 1Ω5 5% |
| 3720 | 4822 117 13574 | 1Ω5 5% |
| 3721 | 4822 117 13572 | 22Ω 5% |
| 3722 | 4822 117 13572 | 22Ω 5% |
| 3725 | 4822 051 30105 | 1M 5% 0.062W |
| 3728 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3731 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3732 | 4822 051 10102 | 1k 2% 0.25W |
| 3733 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3739 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3740 | 4822 051 30008 | 0Ω jumper |
| 3741 | 4822 051 30102 | 1k 5% 0.062W |
| 3744 | 4822 051 30102 | 1k 5% 0.062W |
| 3745 | 4822 051 30102 | 1k 5% 0.062W |
| 3746 | 4822 051 30472 | 4k7 5% 0.062W |
| 3747 | 4822 051 30689 | 68Ω 5% 0.063W |
| 3748 | 4822 051 30689 | 68Ω 5% 0.063W |
| 3749 | 4822 051 30689 | 68Ω 5% 0.063W |
| 3754 | 4822 051 30109 | 10Ω 5% 0.062W |
| 3755 | 4822 051 30008 | 0Ω jumper |
| 3757 | 4822 051 30008 | 0Ω jumper |
| 3759 | 4822 051 30008 | 0Ω jumper |
| 3790 | 3198 031 11010 | 4 X 100Ω PM5 |
| 3791 | 3198 031 11010 | 4 X 100Ω PM5 |
| 3792 | 3198 031 11010 | 4 X 100Ω PM5 |
| 3793 | 3198 031 11010 | 4 X 100Ω PM5 |
| 3794 | 3198 031 11010 | 4 X 100Ω PM5 |
| 3795 | 3198 031 11010 | 4 X 100Ω PM5 |
| 3796 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3797 | 4822 051 30101 | 100Ω 5% 0.062W |
| 3798 | 4822 117 13572 | 22Ω 5% |

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| 5301 | 4822 157 11876 | 6.8µH 10% |
| 5302 | 4822 157 11876 | 6.8µH 10% |
| 5403 | 2422 549 44461 | COI VAR |
| 5404 | 2422 535 95427 | Bead 120R at 100MHz |
| 5405 | 2422 535 95427 | Bead 120R at 100MHz |
| 5406 | 3198 018 33980 | 3.9uH PM10 |
| 5407 | 3198 018 56880 | 6.8uH PM10 |
| 5408 | 2422 549 44983 | COI VAR |
| 5409 | 3198 018 51080 | 1uH PM10 |
| 5410 | 3198 018 33370 | 0.33uH PM10 |
| 5651 | 2422 549 43769 | Bead 30R at 100MHz |
| 5652 | 2422 549 43769 | Bead 30R at 100MHz |
| 5653 | 2422 549 43769 | Bead 30R at 100MHz |
| 5654 | 4822 157 11716 | Bead BLM21P300SPT |
| 5701 | 4822 157 71206 | Bead BLM21A601SPT |
| 5702 | 2422 535 95427 | Bead 120R at 100MHz |
| 5703 | 4822 157 11716 | Bead BLM21P300SPT |
| 5704 | 4822 157 11716 | Bead BLM21P300SPT |
| 5705 | 2422 535 95427 | Bead 120R at 100MHz |
| 5706 | 4822 157 11778 | 5.6uH 10% |
| 5707 | 4822 157 11074 | 100µH |
| 5708 | 4822 157 11778 | 5.6uH 10% |
| 5709 | 4822 157 11778 | 5.6uH 10% |
| 5710 | 4822 157 11778 | 5.6uH 10% |
| 5711 | 4822 157 11074 | 100µH |
| 5713 | 4822 157 11074 | 100µH |
| 5718 | 3198 018 33370 | 0.33uH PM10 |
| 5720 | 4822 157 11074 | 100µH |
| 5911 | 4822 157 11074 | 100µH |
| 5912 | 4822 157 11074 | 100µH |
| 5913 | 4822 157 11074 | 100µH |
| 5914 | 4822 157 11074 | 100µH |
| 5915 | 4822 157 11074 | 100µH |
| 5916 | 4822 157 11074 | 100µH |
| 5917 | 4822 157 11074 | 100µH |
| 5918 | 4822 157 11074 | 100µH |
| 5919 | 4822 157 11074 | 100µH |
| 5920 | 4822 157 11074 | 100µH |
| 5921 | 4822 157 11074 | 100µH |
| 5922 | 4822 157 11074 | 100µH |
| 5923 | 4822 157 11074 | 100µH |
| 5924 | 4822 157 11074 | 100µH |
| 5925 | 4822 157 11074 | 100µH |
| 5926 | 4822 157 11074 | 100µH |
| 5927 | 4822 157 11074 | 100µH |
| 5928 | 4822 157 11074 | 100µH |
| 5929 | 4822 157 11074 | 100µH |
| 5930 | 4822 157 11074 | 100µH |
| 5931 | 4822 157 11074 | 100µH |
| 5932 | 4822 157 11074 | 100µH |
| 5933 | 4822 157 11074 | 100µH |
| 5934 | 4822 157 11074 | 100µH |
| 5935 | 4822 157 11074 | 100µH |
| 5940 | 4822 157 11074 | 100µH |
| 5941 | 4822 157 11074 | 100µH |
| 5942 | 4822 157 11074 | 100µH |
| 5943 | 4822 157 11074 | 100µH |
| 5944 | 4822 157 11074 | 100µH |
| 5947 | 4822 157 11074 | 100µH |
| 5948 | 4822 157 11074 | 100µH |
| 5949 | 4822 157 11074 | 100µH |
| 5950 | 4822 157 11074 | 100µH |
| 5951 | 4822 157 11074 | 100µH |

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| 6001 | 4822 130 11528 | 1PS76SB10 |
| 6002 | 4822 130 83757 | MCL4148 |
| 6003 | 4822 130 11528 | 1PS76SB10 |
| 6303 | 4822 130 11594 | BZX284-C47 |
| 6304 | 4822 130 83757 | MCL4148 |
| 6306 | 9322 129 37685 | DIO REG SM BZM55-C5V6 (TEG0) |
| 6307 | 4822 130 11528 | 1PS76SB10 |
| 6309 | 4822 130 83757 | MCL4148 |
| 6310 | 9322 129 38685 | DIO REG SM BZM55-C6V8 (TEG0) |
| 6311 | 9322 149 08685 | DIO REG SM BZM55-C22 (VISH) R |
| 6312 | 4822 130 83757 | MCL4148 |
| 6313 | 9322 149 08685 | DIO REG SM BZM55-C22 (VISH) R |
| 6314 | 4822 130 83757 | MCL4148 |
| 6319 | 4822 130 83757 | MCL4148 |
| 6334 | 4822 130 83757 | MCL4148 |
| 6403 | 4822 130 11525 | 1SS356 |
| 6652 | 9322 129 40685 | BZM55-C10 |
| 6653 | 4822 130 83757 | MCL4148 |

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|---|---|---|
| 7001 | 9352 629 88557 | SAA5801H/011 |
| 7002 | 9340 218 50115 | BC857BW |
| 7003 | 3198 010 42310 | BC847BW |
| 7004 | 3198 010 42310 | BC847BW |
| 7005 | 9322 116 74668 | LD1117D33 |
| 7006 | 9965 000 07280 | Software, see Prod.Surv. |
| 7007 | 9322 157 20668 | MSM51V18165F-60J |
| 7008 | 3198 010 42310 | BC847BW |
| 7009 | 3198 010 42310 | BC847BW |
| 7010 | 9340 218 50115 | BC857BW |
| 7011 | 9322 156 81668 | M24C32-WMN6TNKSA |
| 7014 | 3198 010 42310 | BC847BW |
| 7015 | 9340 218 50115 | BC857BW (PHSE) |
| 7301 | 9352 685 88518 | TDA9330H/N2/S2 |
| 7303 | 9340 218 50115 | BC857BW (PHSE) |
| 7308 | 9340 310 30215 | PDTC144ET |
| 7309 | 9340 310 30215 | PDTC144ET |
| 7310 | 9340 310 30215 | PDTC144ET |
| 7311 | 3198 010 42310 | BC847BW |
| 7312 | 3198 010 42310 | BC847BW |
| 7320 | 3198 010 42310 | BC847BW |
| 7322 | 3198 010 42310 | BC847BW |
| 7323 | 9352 625 24518 | TDA9321H/N2 |
| 7324 | 9340 217 80115 | BC847CW |
| 7340 | 3198 010 42310 | BC847BW |
| 7403 | 4822 130 60511 | BC847B |
| 7407 | 4822 130 60373 | BC856B |
| 7411 | 4822 130 60511 | BC847B |
| 7651 | 9322 169 38702 | MSP3411G-FH-B8 |
| 7652 | 9351 874 90118 | 74HC4052PW |
| 7656 | 9340 425 20115 | BC847BS |
| 7674 | 3198 010 42310 | BC847BW |
| 7680 | 3198 010 42310 | BC847BW |
| 7701 | 9340 218 50115 | BC857BW |
| 7702 | 3198 010 42310 | BC847BW |
| 7704 | 4822 209 73852 | PMBT2369 |
| 7708 | 4822 209 90034 | SAA4990H/V0 |
| 7709 | 9352 640 20557 | SAA4978H/V203 |
| 7713 | 9322 116 74668 | LD1117D33 |
| 7714 | 4822 209 17307 | MSM54V12222A-30JS |
| 7715 | 4822 209 17307 | MSM54V12222A-30JS |
| 7716 | 3104 317 42341 | FBX Software R_EP_2 |

## DC-shift + Anti-Moiré [G]

### Various

| | | |
|---|---|---|
| 0317 | 4822 265 20723 | CON 2P Male |
| 0318 | 4822 265 20723 | CON 2P Male |
| 0325 | 2422 025 16382 | CON 3P Male |
| 0329 | 2422 025 16382 | CON 3P Male |
| 0395 | 2422 025 16407 | CON 3P Male |
| 1430 | 2422 086 10581 | Fuse 400mA |

⊣⊢

| | | |
|---|---|---|
| 2430 | 4822 122 31177 | 470pF 10% 500V |
| 2431 | 4822 122 31177 | 470pF 10% 500V |
| 2640 | 4822 124 11767 | 470µF 20% 25V |
| 2641 | 4822 126 14305 | 100nF 10% 16V |

-▭-

| | | |
|---|---|---|
| 3640 | 4822 051 30103 | 10k 5% 0.062W |
| 3641 | 4822 051 30223 | 22k 5% 0.062W |
| 3642 | 4822 052 10229 | 22Ω 5% 0.33W |
| 3648 | 5322 117 13029 | 47k 1% 0.063W |
| 3649 | 2322 704 65603 | 56k 1% 0.063W |
| 3650 | 5322 117 13037 | 2k2 1% 0.063W |
| 3651 | 4822 051 30221 | 220Ω 5% 0.062W |
| 3652 | 4822 051 30152 | 1k5 5% 0.062W |
| 3999 | 4822 051 30102 | 1k 5% 0.062W |

-⌇-

| | | |
|---|---|---|
| 5430 | 3128 138 38911 | DC SHIFT COIL |

→⊢

| | | |
|---|---|---|
| 6432 | 9340 317 00133 | BYD33V |
| 6433 | 9340 317 00133 | BYD33V |
| 6640 | 4822 130 83757 | MCL4148 |
| 6641 | 9340 548 67115 | PDZ22B |
| 6642 | 4822 130 11148 | UDZ4.7B |
| 6643 | 9340 548 52115 | PDZ5.1B |
| 6646 | 4822 130 83757 | MCL4148 |

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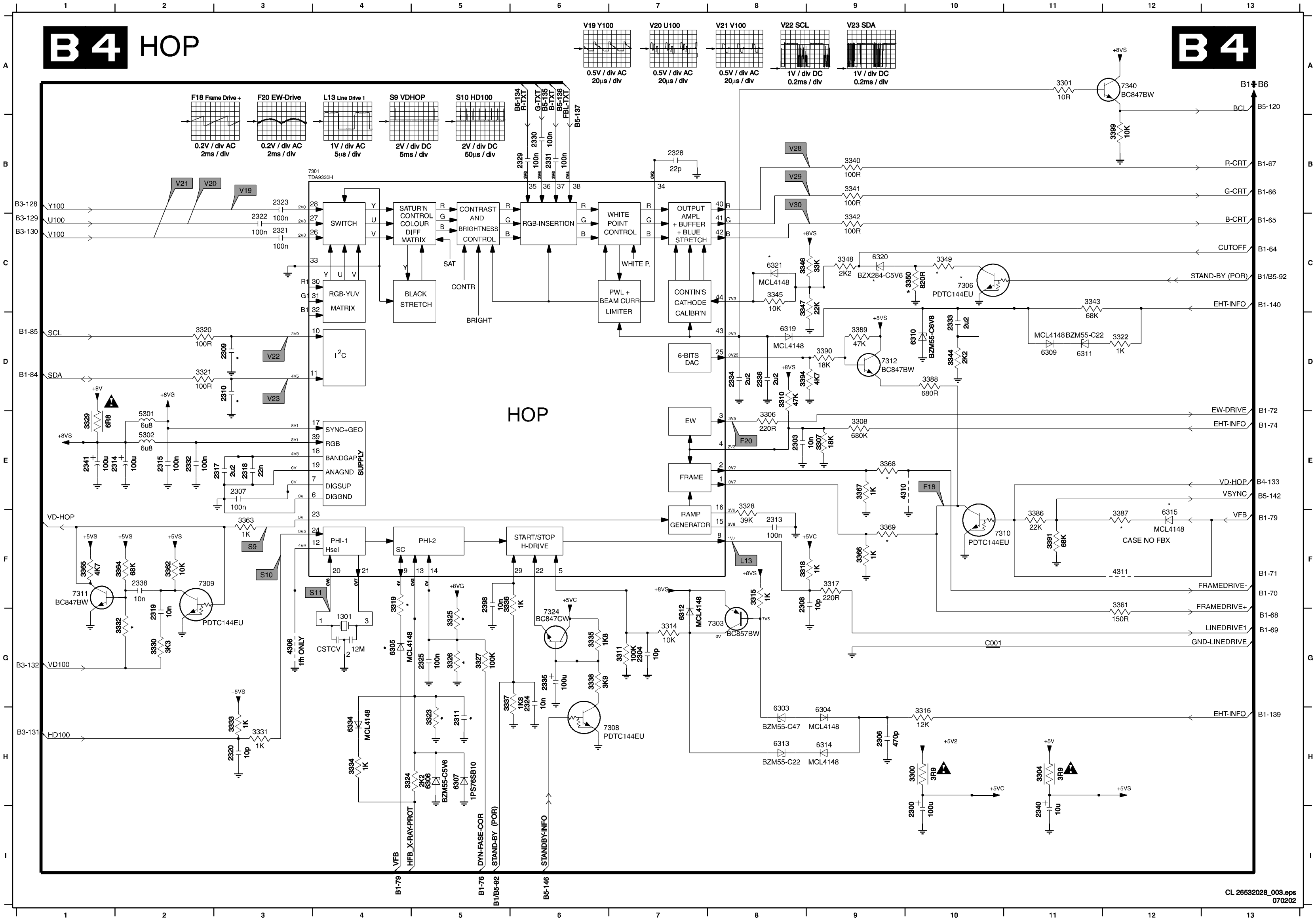
| | | |
|---|---|---|
| 7640 | 9337 133 90653 | 74HCT74D |
| 7642 | 4822 130 60373 | BC856B |

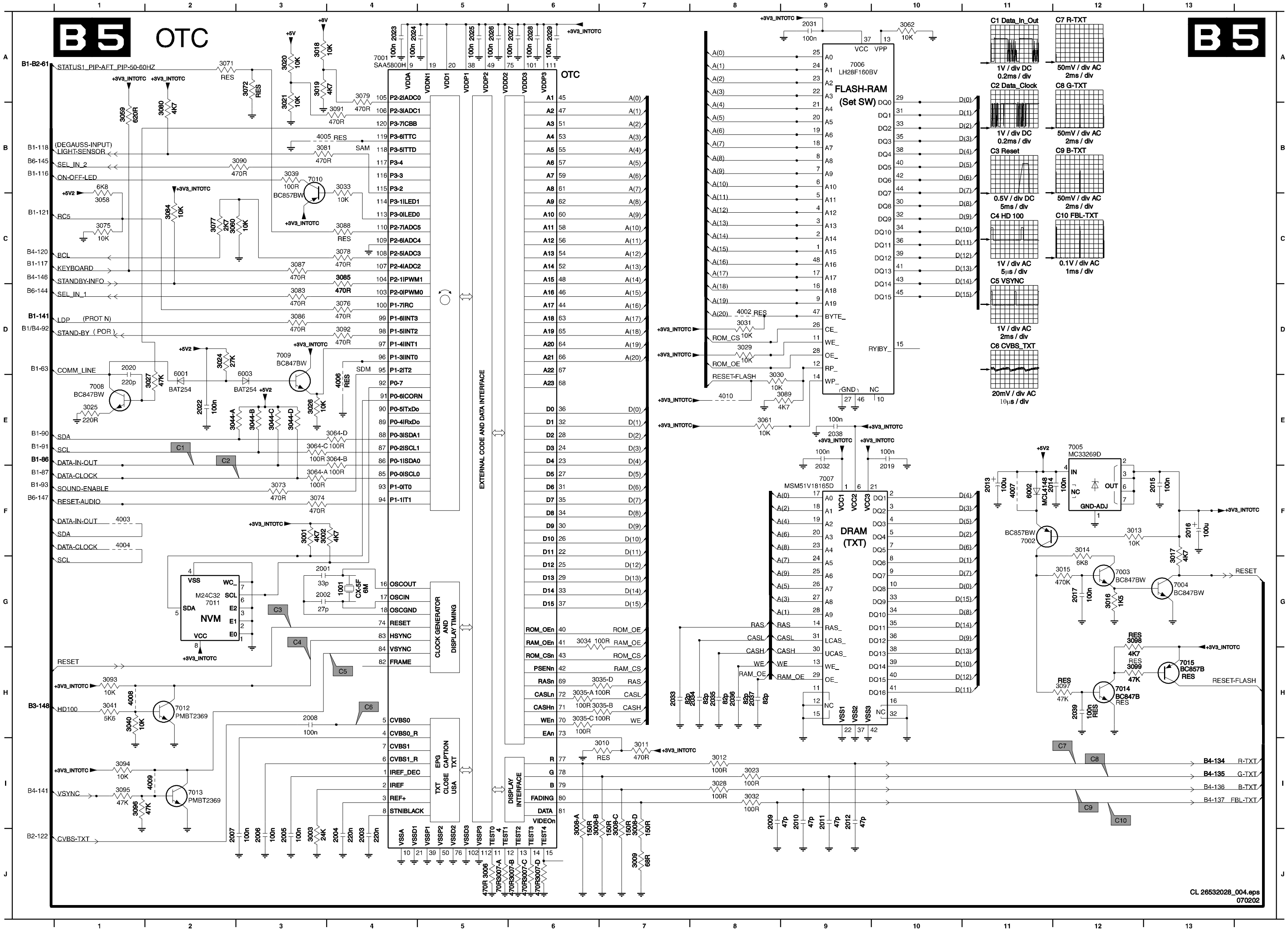
# Electrical Diagrams and Print-Layouts

## SSB: HOP


B4 HOP
V19 Y100 0.5V / div AC 20µs / div
V20 U100 0.5V / div AC 20µs / div
V21 Y100 0.5V / div AC 20µs / div
V22 SCL 1V / div DC 0.2ms / div
V23 SDA 1V / div DC 0.2ms / div
F18 Frame Drive + 0.2V / div AC 2ms / div
F20 EW-Drive 0.2V / div AC 2ms / div
L13 Line Drive 1 1V / div AC 5µs / div
S9 VDHOP 2V / div DC 5ms / div
S10 HD100 2V / div DC 50µs / div
7301 TDA9330H
HOP
SWITCH
SATUR'N CONTROL COLOUR DIFF MATRIX
CONTRAST AND BRIGHTNESS CONTROL
RGB-INSERTION
WHITE POINT CONTROL
OUTPUT AMPL + BUFFER + BLUE STRETCH
RGB-YUV MATRIX
BLACK STRETCH
PWL + BEAM CURR LIMITER
CONTIN'S CATHODE CALIBR'N
I²C
6-BITS DAC
EW
FRAME
RAMP GENERATOR
SYNC+GEO RGB BANDGAP ANAGND DIGSUP DIGGND SUPPLY
PHI-1 Hsel
PHI-2 SC
START/STOP H-DRIVE
SAT CONTR BRIGHT WHITE P.
B3-128 Y100
B3-129 U100
B3-130 V100
B1-85 SCL
B1-84 SDA
VD-HOP
B3-132 VD100
B3-131 HD100
B5-134 R-TXT
G-TXT B5-135
B-TXT B5-136
FBL-TXT B5-137
B1‡B6
BCL B5-120
R-CRT B1-67
G-CRT B1-66
B-CRT B1-65
CUTOFF B1-64
STAND-BY (POR) B1/B5-92
EHT-INFO B1-140
EW-DRIVE B1-72
EHT-INFO B1-74
VD-HOP B4-133
VSYNC B5-142
VFB B1-79
B1-71
FRAMEDRIVE- B1-70
FRAMEDRIVE+ B1-68
LINEDRIVE1 B1-69
GND-LINEDRIVE
EHT-INFO B1-139
VFB B1-79
HFB_X-RAY-PROT
DYN-FASE-COR B1-76
STAND-BY (POR) B1/B5-92
STANDBY-INFO B5-146
7340 BC847BW
7306 PDTC144EU
7312 BC847BW
7310 PDTC144EU
7303 BC857BW
7324 BC847CW
7308 PDTC144EU
7311 BC847BW
7309 PDTC144EU
1301 CSTCV 12M
4306 1fh ONLY
4311
CASE NO FBX
C001
+8VS +8VG +5VS +5VC +5V2 +5V +8V
CL 26532028_003.eps 070202

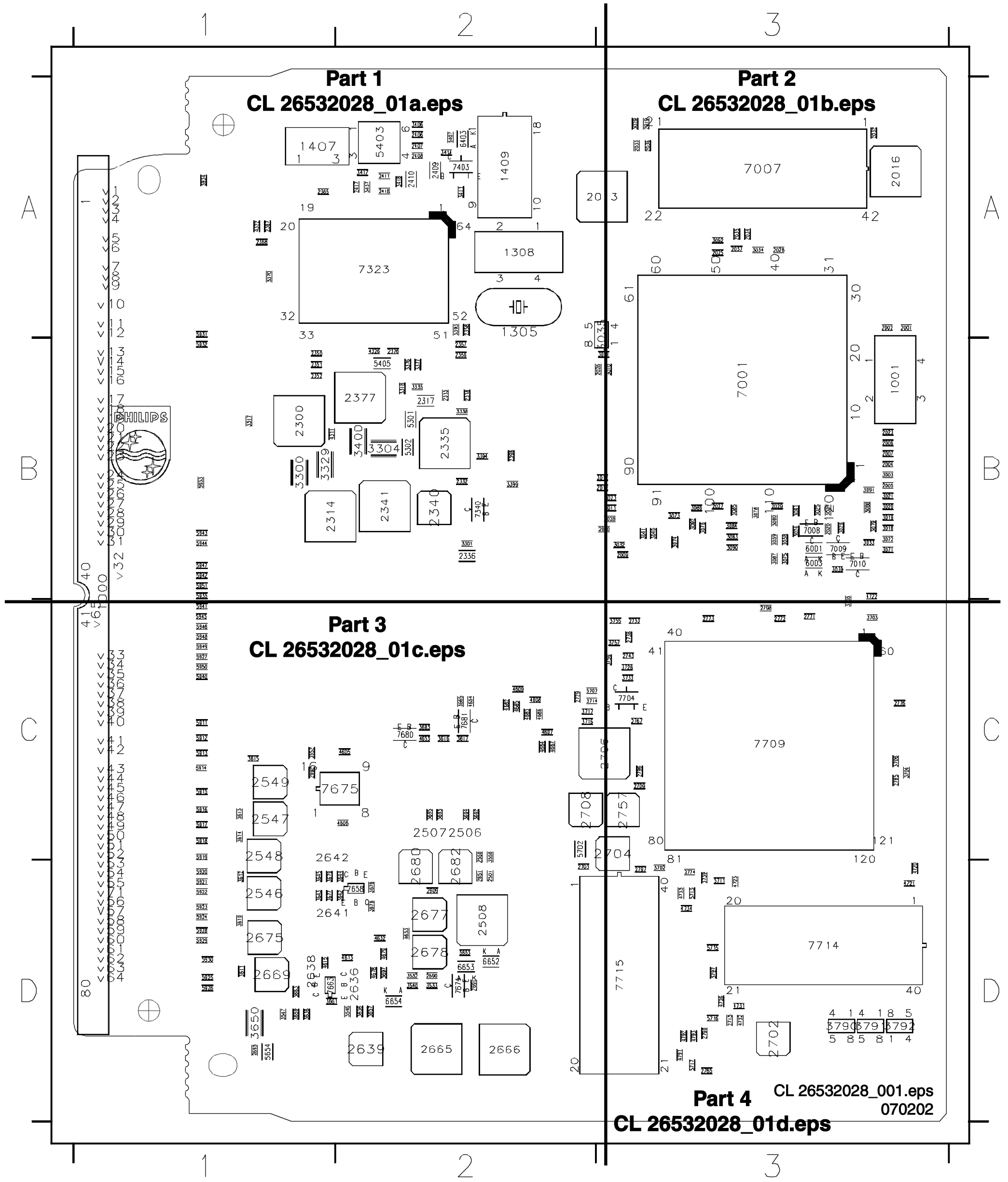
| Item | Location |
|---|---|
| 1301 | G4 |
| 2300 | I10 |
| 2303 | E8 |
| 2304 | G7 |
| 2306 | H9 |
| 2307 | E3 |
| 2308 | F8 |
| 2309 | D3 |
| 2310 | D3 |
| 2311 | H5 |
| 2313 | F8 |
| 2314 | E2 |
| 2315 | E2 |
| 2317 | E3 |
| 2318 | E3 |
| 2319 | G2 |
| 2320 | H3 |
| 2321 | C3 |
| 2322 | C3 |
| 2323 | B3 |
| 2324 | G6 |
| 2325 | G5 |
| 2328 | B7 |
| 2329 | B6 |
| 2330 | B6 |
| 2331 | B6 |
| 2332 | E2 |
| 2333 | D10 |
| 2334 | D8 |
| 2335 | G6 |
| 2336 | D8 |
| 2338 | F2 |
| 2340 | I11 |
| 2341 | E1 |
| 2398 | F5 |
| 3300 | H10 |
| 3301 | A11 |
| 3304 | H11 |
| 3306 | E8 |
| 3307 | E9 |
| 3308 | E9 |
| 3310 | D8 |
| 3311 | G7 |
| 3314 | G7 |
| 3315 | F8 |
| 3316 | H10 |
| 3317 | F9 |
| 3318 | F8 |
| 3319 | F4 |
| 3320 | D2 |
| 3321 | D2 |
| 3322 | D12 |
| 3323 | H5 |
| 3324 | H4 |
| 3325 | G5 |
| 3326 | G5 |
| 3327 | G5 |
| 3328 | E8 |
| 3329 | E1 |
| 3330 | G2 |
| 3331 | H3 |
| 3332 | G2 |
| 3333 | H3 |
| 3334 | H4 |
| 3335 | G6 |
| 3336 | F5 |
| 3337 | G5 |
| 3338 | G6 |
| 3340 | B9 |
| 3341 | B9 |
| 3342 | C9 |
| 3343 | C11 |
| 3344 | D10 |
| 3345 | C8 |
| 3346 | C8 |
| 3347 | C8 |
| 3348 | C9 |
| 3349 | C10 |
| 3350 | C10 |
| 3361 | F12 |
| 3362 | F2 |
| 3363 | F3 |
| 3364 | F2 |
| 3365 | F1 |
| 3366 | F9 |
| 3367 | E9 |
| 3368 | E9 |
| 3369 | F9 |
| 3386 | F11 |
| 3387 | F12 |
| 3388 | D10 |
| 3389 | D9 |
| 3390 | D9 |
| 3391 | F11 |
| 3394 | D8 |
| 3399 | B12 |
| 4306 | G3 |
| 4310 | E10 |
| 4311 | F12 |
| 5301 | E2 |
| 5302 | E2 |
| 6303 | H8 |
| 6304 | H9 |
| 6305 | G4 |
| 6306 | H5 |
| 6307 | H5 |
| 6309 | D11 |
| 6310 | D10 |
| 6311 | D11 |
| 6312 | G7 |
| 6313 | H8 |
| 6314 | H9 |
| 6315 | F12 |
| 6319 | D8 |
| 6320 | C9 |
| 6321 | C8 |
| 6334 | H4 |
| 7301 | B3 |
| 7303 | G8 |
| 7306 | C10 |
| 7308 | H6 |
| 7309 | F3 |
| 7310 | F11 |
| 7311 | F1 |
| 7312 | D9 |
| 7324 | G6 |
| 7340 | A12 |
| C001 | G10 |

## SSB: OTC


B5
OTC
7001 SAA5800H
OTC
EXTERNAL CODE AND DATA INTERFACE
CLOCK GENERATOR AND DISPLAY TIMING
EPG CLOSE CAPTION TXT USA
DISPLAY INTERFACE
7006 LH28F160BV
FLASH-RAM (Set SW)
7007 MSM51V18165D
DRAM (TXT)
7011 M24C32
NVM
7005 MC33269D
GND-ADJ
7002 BC857BW
7003 BC847BW
7004 BC847BW
7008 BC847BW
7009 BC847BW
7010 BC857BW
7012 PMBT2369
7013 PMBT2369
7014 BC847B
7015 BC857B
1001 CX-5F 6M
STATUS1_PIP-AFT_PIP-50-60HZ
(DEGAUSS-INPUT) LIGHT-SENSOR
SEL_IN_2
ON-OFF-LED
RC5
BCL
KEYBOARD
STANDBY-INFO
SEL_IN_1
LDP (PROT N)
STAND-BY (POR)
COMM_LINE
SDA
SCL
DATA-IN-OUT
DATA-CLOCK
SOUND-ENABLE
RESET-AUDIO
RESET
HD100
VSYNC
CVBS-TXT
RESET-FLASH
R-TXT
G-TXT
B-TXT
FBL-TXT
C1 Data_In_Out 1V / div DC 0.2ms / div
C2 Data_Clock 1V / div DC 0.2ms / div
C3 Reset 0.5V / div DC 5ms / div
C4 HD 100 1V / div AC 5μs / div
C5 VSYNC 1V / div AC 2ms / div
C6 CVBS_TXT 20mV / div AC 10μs / div
C7 R-TXT 50mV / div AC 2ms / div
C8 G-TXT 50mV / div AC 2ms / div
C9 B-TXT 50mV / div AC 2ms / div
C10 FBL-TXT 0.1V / div AC 1ms / div
+3V3_INTOTC
+5V
+5V2
+8V
CL 26532028_004.eps 070202

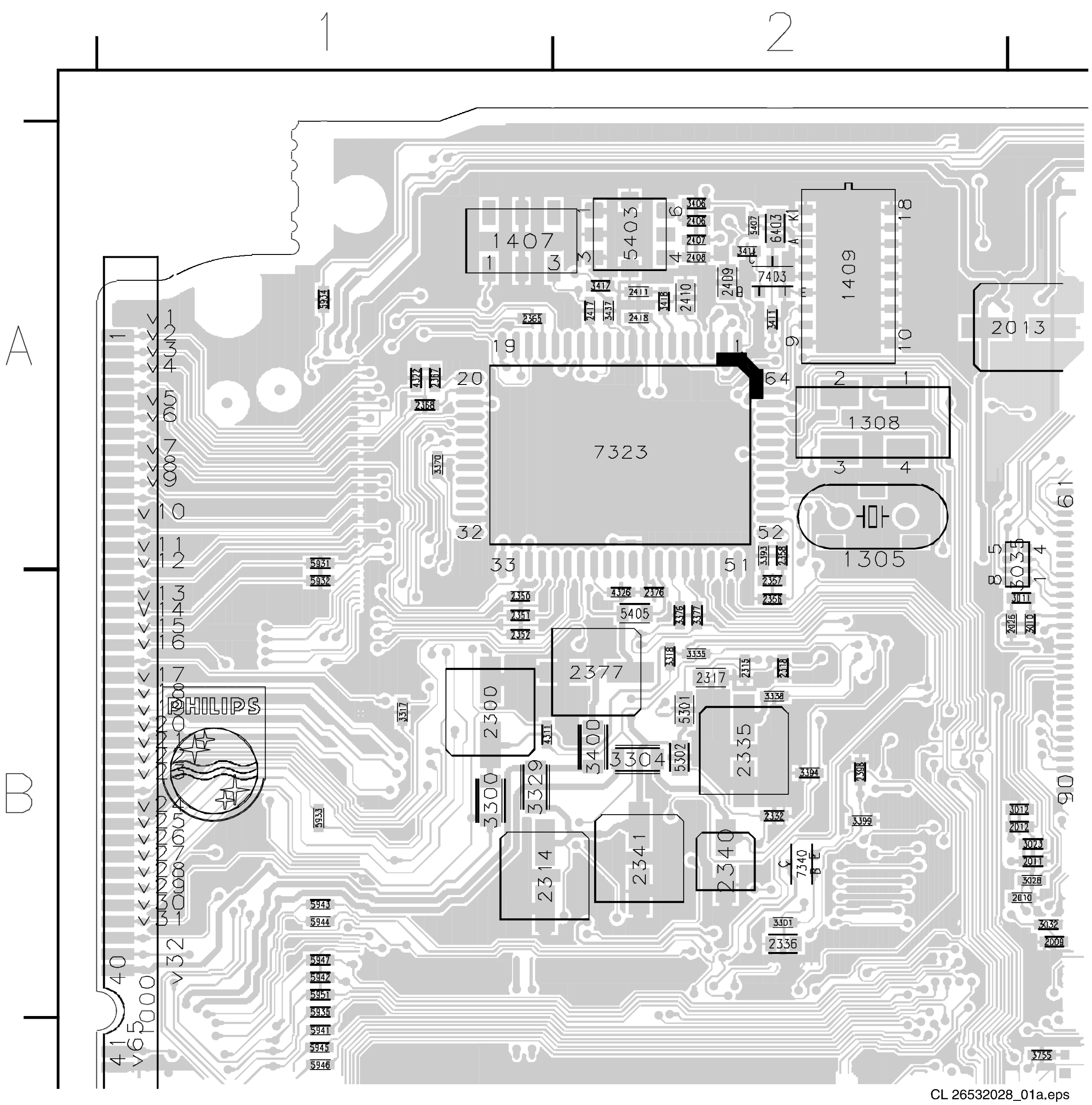
| | |
|---|---|
| 1001 G4 | |
| 2001 G3 | |
| 2002 G3 | |
| 2003 J4 | |
| 2004 J4 | |
| 2005 J3 | |
| 2006 J3 | |
| 2007 J2 | |
| 2008 H3 | |
| 2009 I8 | |
| 2010 I9 | |
| 2011 I9 | |
| 2012 I9 | |
| 2013 F11 | |
| 2014 F11 | |
| 2015 F13 | |
| 2016 F13 | |
| 2017 G12 | |
| 2019 E10 | |
| 2020 D1 | |
| 2022 E2 | |
| 2023 A4 | |
| 2024 A4 | |
| 2025 A5 | |
| 2026 A5 | |
| 2027 A6 | |
| 2028 A6 | |
| 2029 A6 | |
| 2031 A9 | |
| 2032 E9 | |
| 2033 H7 | |
| 2034 H8 | |
| 2035 H8 | |
| 2036 H8 | |
| 2037 H8 | |
| 2038 E9 | |
| 2039 H12 | |
| 3001 F3 | |
| 3002 F3 | |
| 3003 J3 | |
| 3006 J5 | |
| 3007-A J5 | |
| 3007-B J6 | |
| 3007-C J6 | |
| 3007-D J6 | |
| 3008-A I6 | |
| 3008-B I6 | |
| 3008-C I7 | |
| 3008-D I7 | |
| 3009 J7 | |
| 3010 I7 | |
| 3011 I7 | |
| 3012 I8 | |
| 3013 F12 | |
| 3014 F12 | |
| 3015 G12 | |
| 3016 G12 | |
| 3017 F13 | |
| 3018 A3 | |
| 3019 A3 | |
| 3020 A3 | |
| 3021 A3 | |
| 3023 I8 | |
| 3024 D2 | |
| 3025 E1 | |
| 3026 E3 | |
| 3027 E2 | |
| 3028 I8 | |
| 3029 D8 | |
| 3030 E8 | |
| 3031 D8 | |
| 3032 I8 | |
| 3033 B4 | |
| 3034 G6 | |
| 3035-A H6 | |
| 3035-B H7 | |
| 3035-C H6 | |
| 3035-D H7 | |
| 3039 B3 | |
| 3040 H1 | |
| 3041 H1 | |
| **3044-A E2** | |
| **3044-B E3** | |
| **3044-C E3** | |
| **3044-D E3** | |
| **3058 C1** | |
| **3059 B1** | |
| **3060 C2** | |
| **3061 E8** | |
| **3062 A10** | |
| **3064-A F3** | |
| **3064-B E4** | |
| **3064-C E3** | |
| **3064-D E4** | |
| 3071 A2 | |
| 3072 A3 | |
| 3073 F3 | |
| 3074 F3 | |
| 3075 C1 | |
| 3076 D4 | |
| 3077 C2 | |
| 3078 C4 | |
| 3079 A4 | |
| 3080 B2 | |
| 3081 B3 | |
| 3083 D3 | |
| 3084 C2 | |
| 3085 C4 | |
| 3086 D3 | |
| 3087 C3 | |
| 3088 C4 | |
| 3089 E9 | |
| 3090 B3 | |
| 3091 B4 | |
| 3092 D4 | |
| 3093 H1 | |
| 3094 I1 | |
| 3095 I1 | |
| 3096 I1 | |
| 3097 H12 | |
| 3098 G12 | |
| 3099 H12 | |
| 4002 D8 | |
| 4003 F1 | |
| 4004 F1 | |
| 4005 B3 | |
| 4006 E4 | |
| 4007 F11 | |
| 4008 H1 | |
| 4009 I2 | |
| 4010 E8 | |
| 6001 E2 | |
| 6002 F11 | |
| 6003 E3 | |
| 7001 A4 | |
| 7002 F11 | |
| 7003 G12 | |
| 7004 G13 | |
| 7005 E12 | |
| 7006 A9 | |
| **7007 F9** | |
| **7008 E1** | |
| **7009 D3** | |
| **7010 B3** | |
| **7011 G2** | |
| **7012 H2** | |
| 7013 I2 | |
| 7014 H12 | |
| 7015 H13 | |

## Layout SSB (Overview LOT Side)



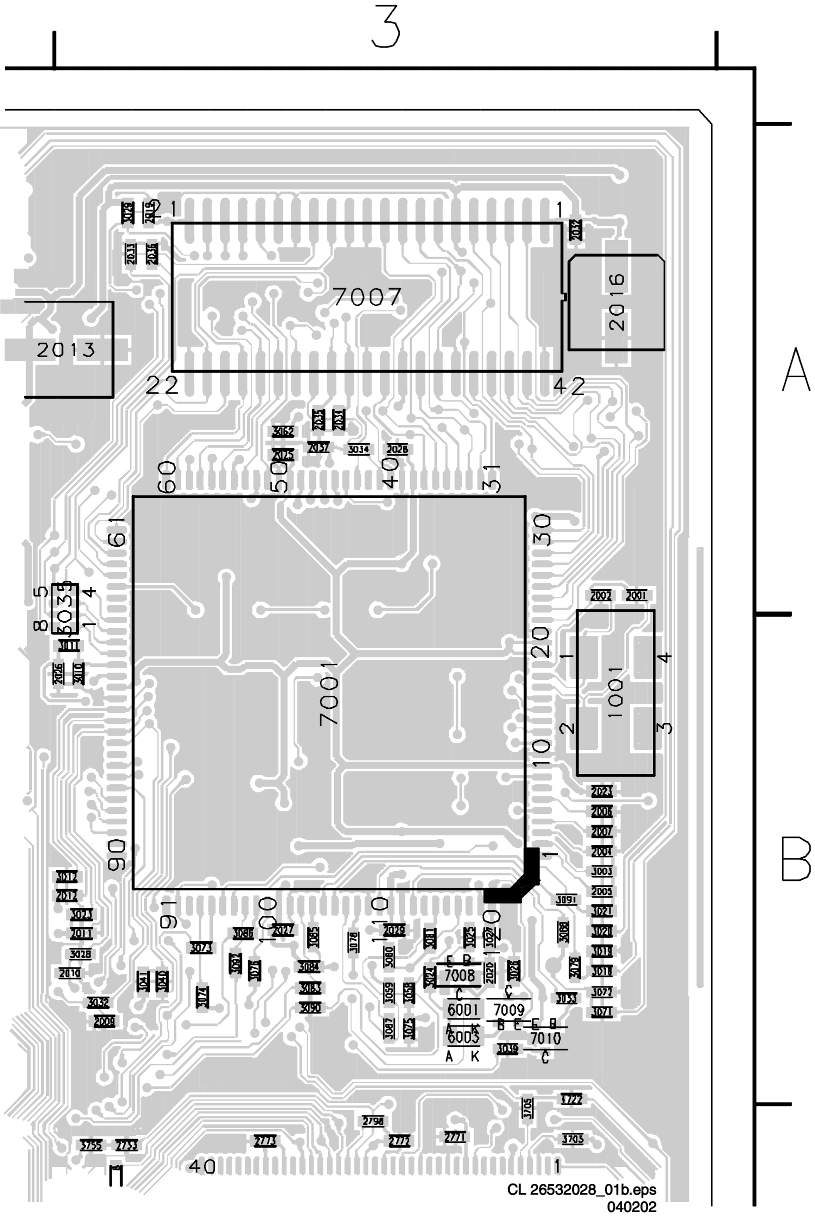
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1000 | B1 | 2550 | C2 | 3072 | B3 | 3683 | C2 | 5716 | D3 |
| 1001 | B3 | 2609 | D2 | 3073 | B3 | 3692 | C2 | 5717 | D3 |
| 1305 | A2 | 2636 | D2 | 3074 | B3 | 3693 | C2 | 5911 | C1 |
| 1308 | A2 | 2638 | D1 | 3075 | B3 | 3694 | C2 | 5912 | C1 |
| 1407 | A1 | 2639 | D1 | 3076 | B3 | 3695 | C2 | 5913 | C1 |
| 1409 | A2 | 2641 | D1 | 3078 | B3 | 3697 | D2 | 5914 | C1 |
| 2001 | A3 | 2642 | C2 | 3079 | B3 | 3702 | D3 | 5915 | C1 |
| 2002 | A3 | 2651 | D2 | 3080 | B3 | 3703 | C3 | 5916 | C1 |
| 2004 | B3 | 2665 | D2 | 3081 | B3 | 3704 | C3 | 5917 | C1 |
| 2005 | B3 | 2666 | D2 | 3083 | B3 | 3705 | C3 | 5918 | C1 |
| 2006 | B3 | 2669 | D1 | 3084 | B3 | 3706 | C3 | 5919 | C1 |
| 2007 | B3 | 2675 | D1 | 3085 | B3 | 3714 | C2 | 5920 | D1 |
| 2009 | B3 | 2677 | D2 | 3086 | B3 | 3716 | C2 | 5921 | D1 |
| 2010 | B3 | 2678 | D2 | 3087 | B3 | 3717 | C2 | 5922 | D1 |
| 2011 | B3 | 2680 | D2 | 3088 | B3 | 3728 | C3 | 5923 | D1 |
| 2012 | B3 | 2682 | C2 | 3090 | B3 | 3733 | C3 | 5924 | D1 |
| 2013 | A3 | 2690 | D2 | 3091 | B3 | 3739 | D3 | 5925 | D1 |
| 2016 | A3 | 2691 | D2 | 3092 | B3 | 3755 | C3 | 5926 | D1 |
| 2019 | A3 | 2692 | C1 | 3300 | B1 | 3757 | C3 | 5927 | C1 |
| 2020 | B3 | 2693 | D1 | 3301 | B2 | 3759 | C3 | 5928 | D1 |
| 2023 | B3 | 2702 | D3 | 3304 | B2 | 3790 | D3 | 5929 | D1 |
| 2025 | A3 | 2703 | D2 | 3317 | B1 | 3791 | D3 | 5930 | D1 |
| 2026 | B3 | 2704 | C3 | 3318 | B2 | 3792 | D3 | 5931 | A1 |
| 2027 | B3 | 2706 | C2 | 3329 | B2 | 3797 | D3 | 5932 | B1 |
| 2028 | A3 | 2708 | C2 | 3335 | B2 | 4311 | B1 | 5933 | B1 |
| 2029 | B3 | 2709 | C3 | 3338 | B2 | 4322 | A1 | 5934 | A1 |
| 2032 | A3 | 2713 | D3 | 3370 | A1 | 4326 | B2 | 5935 | B1 |
| 2033 | A3 | 2729 | C2 | 3376 | B2 | 4605 | C2 | 5940 | C1 |
| 2034 | A3 | 2733 | C3 | 3377 | B2 | 4606 | C2 | 5941 | C1 |
| 2035 | A3 | 2738 | C3 | 3393 | A2 | 4607 | C2 | 5942 | B1 |
| 2036 | A3 | 2743 | C3 | 3394 | B2 | 4608 | C2 | 5943 | B1 |
| 2037 | A3 | 2757 | C3 | 3399 | B2 | 4609 | C2 | 5944 | B1 |
| 2300 | B1 | 2765 | D3 | 3400 | B2 | 4613 | D2 | 5945 | C1 |
| 2314 | B1 | 2767 | C3 | 3406 | A2 | 4615 | D1 | 5946 | C1 |
| 2315 | B2 | 2771 | C3 | 3411 | A2 | 4632 | D2 | 5947 | B1 |
| 2317 | B2 | 2772 | C3 | 3414 | A2 | 4633 | D2 | 5948 | C1 |
| 2318 | B2 | 2773 | C3 | 3417 | A2 | 4653 | C2 | 5949 | C1 |
| 2332 | B2 | 2774 | D3 | 3418 | A2 | 4654 | C2 | 5950 | C1 |
| 2335 | B2 | 2776 | C3 | 3437 | A2 | 4678 | D2 | 5951 | B1 |
| 2336 | B2 | 2785 | C3 | 3532 | D2 | 4679 | D2 | 6001 | B3 |
| 2340 | B2 | 2790 | D3 | 3533 | D2 | 4682 | C2 | 6003 | B3 |
| 2341 | B2 | 2796 | C3 | 3540 | D2 | 4683 | C2 | 6403 | A2 |
| 2350 | B1 | 2797 | D3 | 3546 | D2 | 4684 | C2 | 6652 | D2 |
| 2351 | B1 | 2798 | C3 | 3547 | D1 | 4685 | C2 | 6653 | D2 |
| 2352 | B1 | 3003 | B3 | 3550 | C2 | 4686 | C2 | 6654 | D2 |
| 2356 | B2 | 3010 | B3 | 3552 | C1 | 4687 | C2 | 7001 | B3 |
| 2357 | B2 | 3011 | B3 | 3610 | D1 | 4720 | D3 | 7007 | A3 |
| 2358 | A2 | 3012 | B3 | 3611 | D1 | 4721 | D3 | 7008 | B3 |
| 2365 | A1 | 3018 | B3 | 3612 | D1 | 4722 | B3 | 7009 | B3 |
| 2367 | A1 | 3019 | B3 | 3613 | C1 | 4723 | D3 | 7010 | B3 |
| 2368 | A1 | 3020 | B3 | 3614 | C1 | 4726 | D3 | 7323 | A1 |
| 2376 | B2 | 3021 | B3 | 3615 | C1 | 4731 | D3 | 7340 | B2 |
| 2377 | B2 | 3023 | B3 | 3616 | C2 | 4732 | D3 | 7403 | A2 |
| 2398 | B2 | 3024 | B3 | 3617 | C2 | 4733 | D3 | 7658 | D2 |
| 2406 | A2 | 3025 | B3 | 3636 | D2 | 4734 | D3 | 7663 | D1 |
| 2407 | A2 | 3026 | B3 | 3638 | D1 | 4791 | D3 | 7674 | D2 |
| 2408 | A2 | 3027 | B3 | 3642 | D2 | 4792 | D3 | 7675 | C2 |
| 2409 | A2 | 3028 | B3 | 3643 | D1 | 4793 | D3 | 7680 | C2 |
| 2410 | A2 | 3029 | A3 | 3644 | D2 | 5301 | B2 | 7681 | C2 |
| 2411 | A2 | 3032 | B3 | 3645 | D1 | 5302 | B2 | 7704 | C3 |
| 2417 | A2 | 3033 | B3 | 3650 | D1 | 5403 | A2 | 7709 | D3 |
| 2418 | A2 | 3034 | A3 | 3657 | D2 | 5405 | B2 | 7714 | D3 |
| 2501 | D2 | 3035 | A3 | 3659 | D1 | 5407 | A2 | 7715 | D3 |
| 2506 | C2 | 3039 | B3 | 3661 | D1 | 5653 | D2 | | |
| 2507 | C2 | 3040 | B3 | 3663 | D1 | 5654 | D1 | | |
| 2508 | D2 | 3041 | B3 | 3665 | C2 | 5702 | C2 | | |
| 2546 | D1 | 3058 | B3 | 3676 | D2 | 5707 | C2 | | |
| 2547 | C1 | 3059 | B3 | 3677 | D1 | 5711 | D3 | | |
| 2548 | C1 | 3062 | A3 | 3678 | D2 | 5713 | D3 | | |
| 2549 | C1 | 3071 | B3 | 3679 | D1 | 5715 | D3 | | |

## Layout SSB (Part 1 LOT Side)


1
2
A
B
1407
5403
1409
2013
7323
1308
1305
7403
6403
2410
2409
2377
2300
2335
3400
3304
3300
3329
2314
2341
2340
2317
5405
5301
5302
2336
7340
6035
PHILIPS
1000
19
20
32
33
51
52
64
61
90

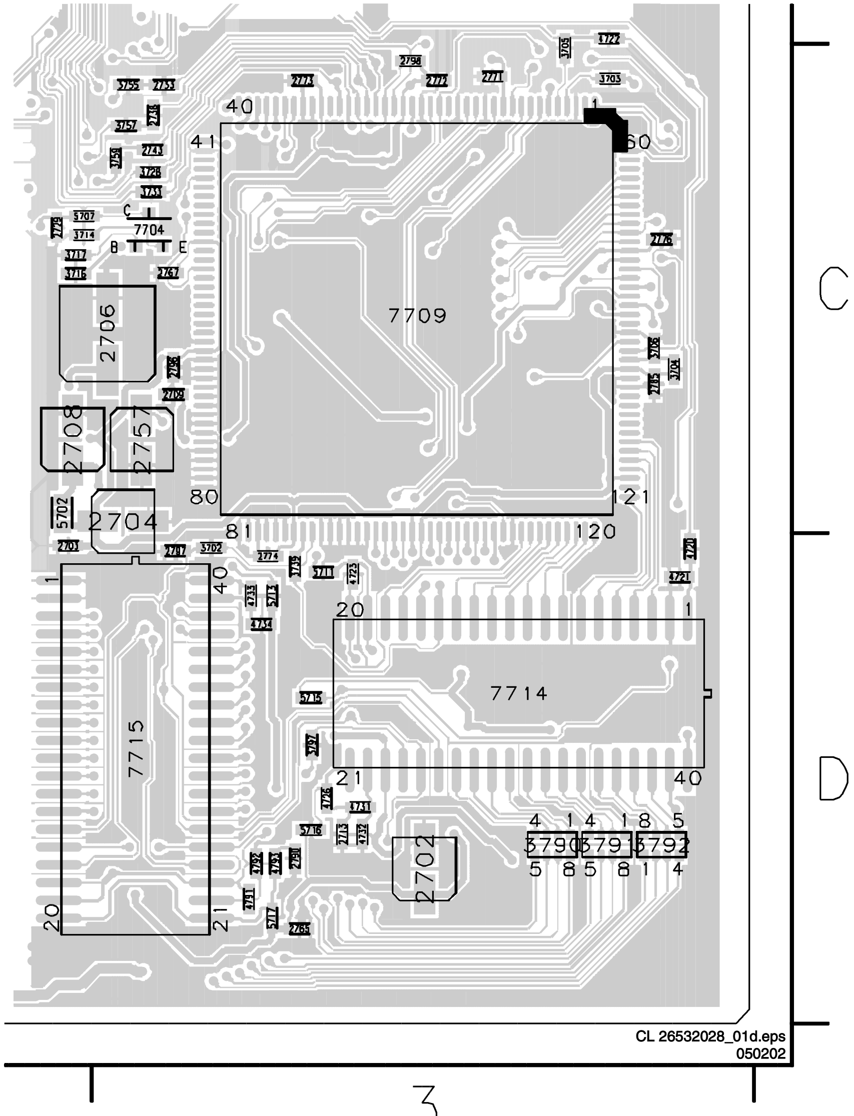
CL 26532028_01a.eps
070202

### Layout SSB (Part 2 LOT Side)


3
A
B
7007
2016
2013
7001
1001
6033
7008
7009
6001
6003
7010

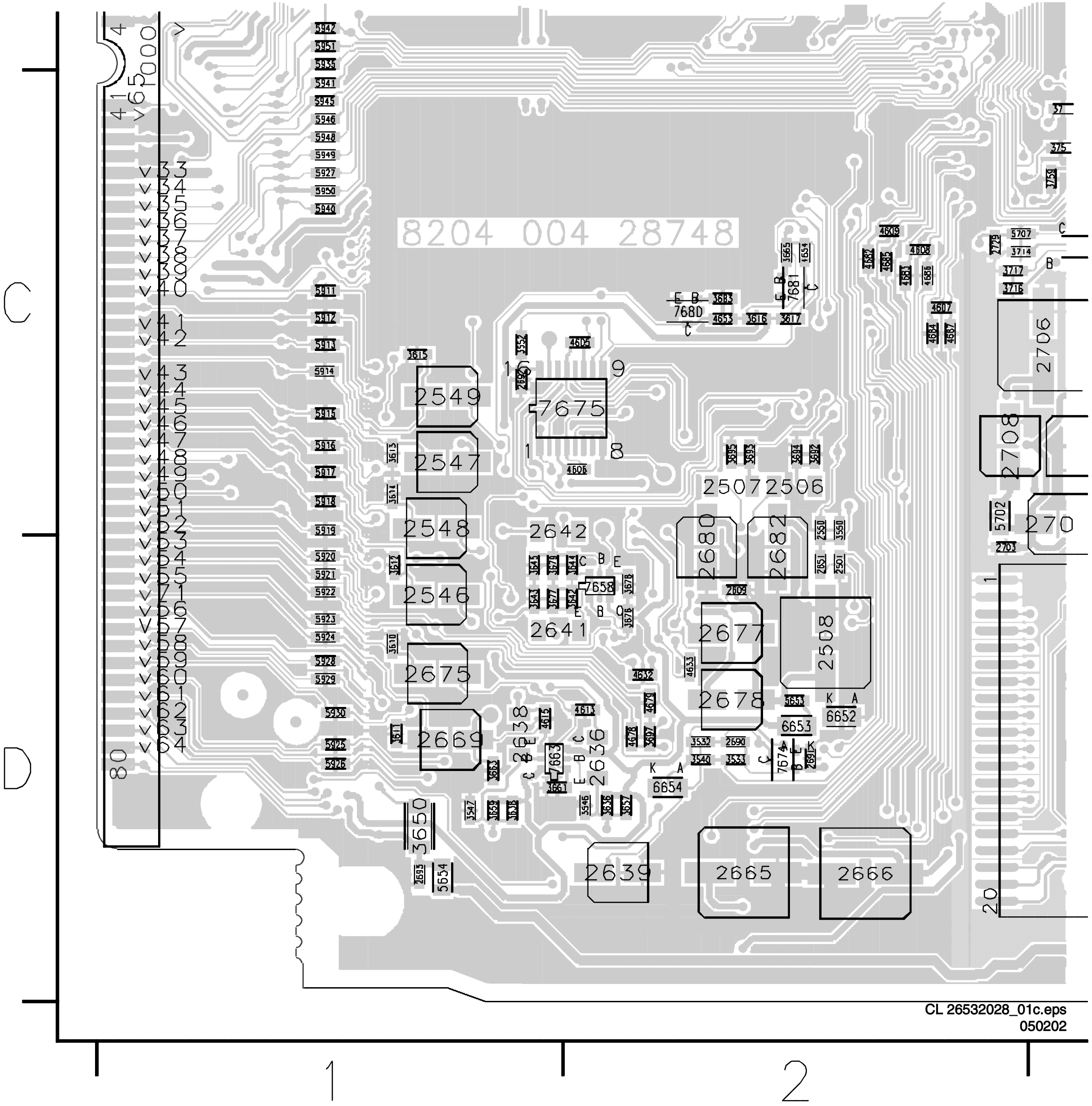
CL 26532028_01b.eps
040202

### Layout SSB (Part 4 LOT Side)


C
D
3
7709
7704
2706
2708
2757
2704
7714
7715
2702
5790
5791
5792

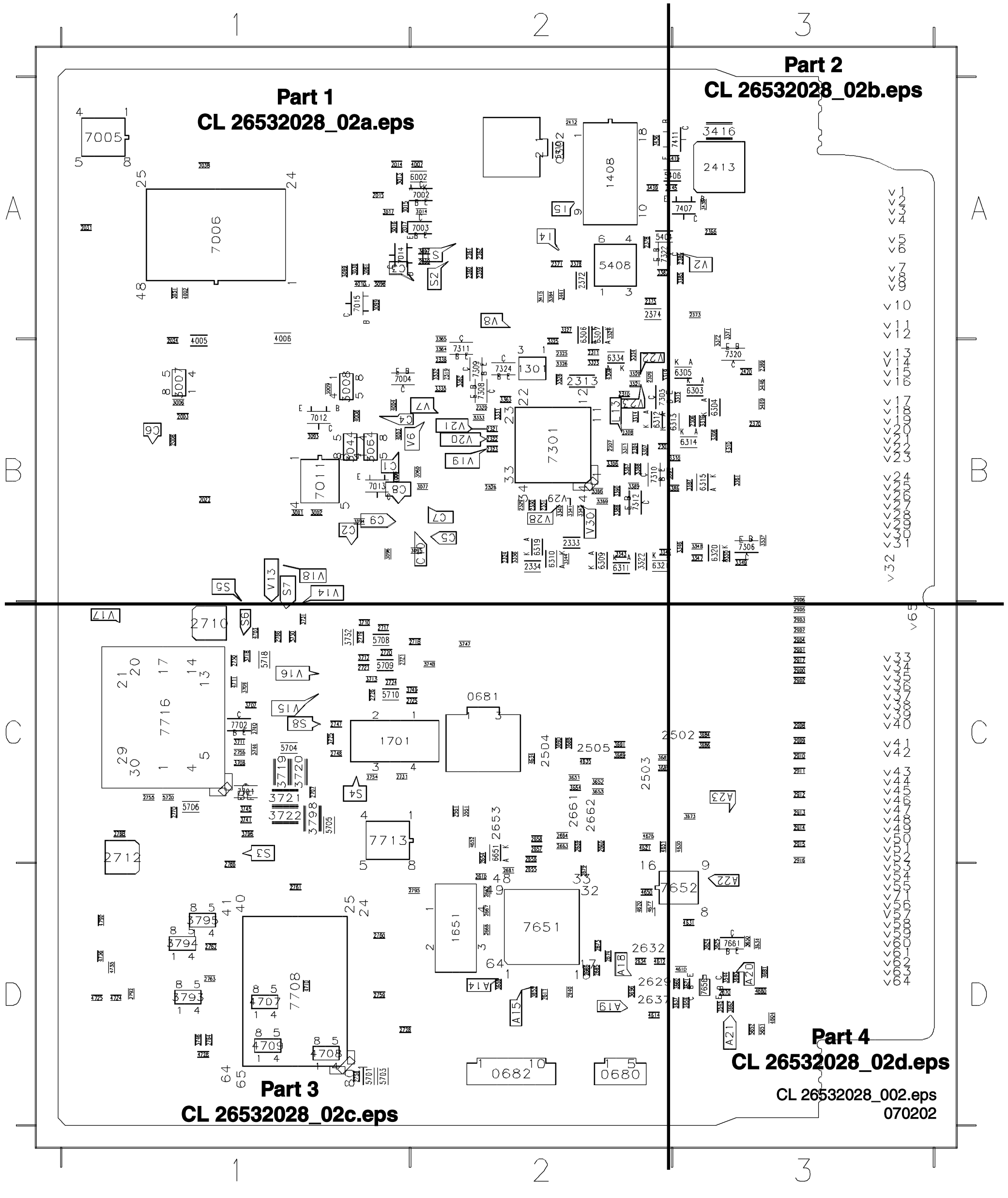
CL 26532028_01d.eps
050202

## Layout SSB (Part 3 LOT Side)


8204 004 28748
C
D
1
2
7675
2549
2547
2548
2546
2675
2669
2642
2641
2638
2636
2639
2665
2666
2677
2678
2680
2682
2508
2507
2506
2706
2708
270
5702
2703
6652
6653
6654
7680
7681
7658
7663
7674
3650
5654
1000
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
71
56
57
58
59
60
61
62
63
64
80
1
20
9
8
16

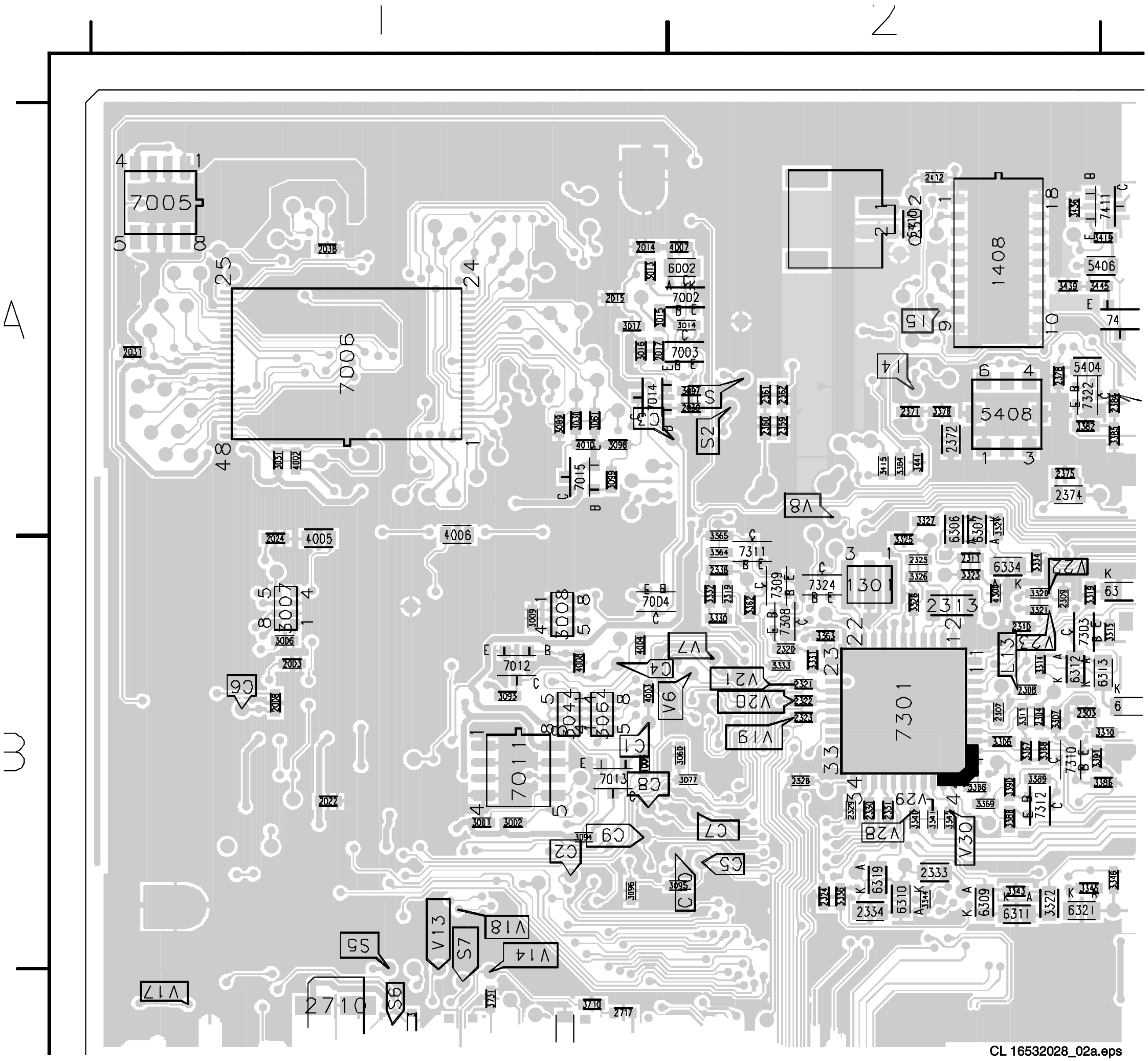
CL 26532028_01c.eps
050202

## Layout SSB (Overview Tuner Side)



| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0302 | A2 | 2637 | D2 | 2914 | C3 | 3365 | A2 | 3732 | C1 | 5718 | C1 |
| 0680 | D2 | 2640 | D2 | 2915 | C3 | 3366 | B2 | 3740 | C1 | 5720 | C1 |
| 0681 | C2 | 2652 | D2 | 2916 | C3 | 3367 | B2 | 3741 | C1 | 6002 | A2 |
| 0682 | D2 | 2653 | C2 | 2917 | C3 | 3368 | B2 | 3744 | C1 | 6303 | B3 |
| 1000 | B3 | 2654 | C2 | 3001 | B1 | 3369 | B2 | 3745 | C1 | 6304 | B3 |
| 1301 | B2 | 2655 | D2 | 3002 | B1 | 3371 | A3 | 3746 | D1 | 6305 | B3 |
| 1305 | A2 | 2656 | C2 | 3006 | B1 | 3372 | B3 | 3747 | C2 | 6306 | A2 |
| 1408 | A2 | 2657 | C2 | 3007 | B1 | 3378 | A2 | 3748 | C2 | 6307 | A2 |
| 1651 | D2 | 2658 | C2 | 3008 | B1 | 3382 | A2 | 3749 | C2 | 6309 | B2 |
| 1701 | C1 | 2659 | C2 | 3009 | B1 | 3384 | A2 | 3754 | C1 | 6310 | B2 |
| 2003 | B1 | 2660 | C2 | 3013 | A1 | 3385 | A3 | 3793 | D1 | 6311 | B2 |
| 2008 | B1 | 2661 | C2 | 3014 | A2 | 3386 | B3 | 3794 | D1 | 6312 | B2 |
| 2014 | A1 | 2662 | C2 | 3015 | A1 | 3387 | B3 | 3795 | D1 | 6313 | B3 |
| 2015 | A1 | 2663 | C2 | 3016 | A1 | 3388 | B2 | 3796 | C1 | 6314 | B3 |
| 2017 | A1 | 2664 | C2 | 3017 | A1 | 3389 | B2 | 3798 | C1 | 6315 | B3 |
| 2022 | B1 | 2667 | D2 | 3030 | A1 | 3390 | B2 | 4002 | A1 | 6319 | B2 |
| 2024 | B1 | 2668 | D2 | 3031 | A1 | 3391 | B2 | 4003 | B1 | 6320 | B3 |
| 2031 | A1 | 2670 | D3 | 3044 | B1 | 3415 | A2 | 4004 | B1 | 6321 | B2 |
| 2038 | A1 | 2673 | D2 | 3060 | B2 | 3416 | A3 | 4005 | B1 | 6334 | A2 |
| 2039 | A2 | 2674 | D2 | 3061 | A1 | 3419 | A3 | 4006 | A1 | 6651 | C2 |
| 2303 | B2 | 2679 | D2 | 3064 | B1 | 3435 | A3 | 4007 | A2 | 7002 | A2 |
| 2304 | B2 | 2681 | D2 | 3077 | B2 | 3436 | A2 | 4008 | B1 | 7003 | A2 |
| 2306 | B3 | 2685 | D2 | 3089 | A1 | 3439 | A2 | 4009 | B1 | 7004 | B1 |
| 2307 | B2 | 2686 | D2 | 3093 | B1 | 3441 | A2 | 4010 | A1 | 7005 | A1 |
| 2308 | B2 | 2707 | C1 | 3094 | B1 | 3445 | A2 | 4306 | B2 | 7006 | A1 |
| 2309 | B2 | 2710 | C1 | 3095 | B2 | 3446 | B3 | 4310 | B3 | 7011 | B1 |
| 2310 | B2 | 2712 | D1 | 3096 | B1 | 3544 | D3 | 4604 | D3 | 7012 | B1 |
| 2311 | B2 | 2717 | C1 | 3097 | A2 | 3545 | D3 | 4610 | D3 | 7013 | B1 |
| 2313 | B2 | 2718 | C2 | 3098 | A1 | 3551 | C2 | 4612 | D2 | 7014 | A2 |
| 2319 | B2 | 2719 | C1 | 3099 | A1 | 3621 | D3 | 4614 | D2 | 7015 | A1 |
| 2320 | B2 | 2720 | C1 | 3306 | B2 | 3624 | D3 | 4620 | D2 | 7301 | B2 |
| 2321 | B2 | 2721 | C1 | 3307 | B2 | 3625 | D3 | 4621 | C2 | 7303 | B2 |
| 2322 | B2 | 2723 | C1 | 3308 | B3 | 3630 | D3 | 4630 | C3 | 7306 | B3 |
| 2323 | B2 | 2724 | C1 | 3310 | B3 | 3634 | D3 | 4631 | D3 | 7308 | B2 |
| 2324 | B2 | 2725 | C2 | 3311 | B2 | 3637 | D3 | 4634 | C2 | 7309 | B2 |
| 2325 | B2 | 2726 | C1 | 3314 | B2 | 3651 | C2 | 4635 | C2 | 7310 | B2 |
| 2328 | B2 | 2728 | D1 | 3315 | B3 | 3652 | C2 | 4650 | D2 | 7311 | A2 |
| 2329 | B2 | 2730 | C1 | 3316 | B3 | 3653 | C2 | 4651 | C2 | 7312 | B2 |
| 2330 | B2 | 2731 | C1 | 3319 | B2 | 3654 | C2 | 4652 | C2 | 7320 | B3 |
| 2331 | B2 | 2747 | C1 | 3320 | B2 | 3655 | D2 | 4676 | C2 | 7322 | A2 |
| 2333 | B2 | 2748 | C1 | 3321 | B2 | 3656 | D2 | 4677 | D2 | 7324 | B2 |
| 2334 | B2 | 2755 | C1 | 3322 | B2 | 3658 | D3 | 4680 | D3 | 7407 | A2 |
| 2338 | B2 | 2756 | C1 | 3323 | B2 | 3660 | D3 | 4681 | D3 | 7411 | A3 |
| 2359 | A2 | 2758 | D1 | 3324 | A2 | 3662 | D3 | 4703 | C1 | 7651 | D2 |
| 2360 | A2 | 2759 | D1 | 3325 | B2 | 3673 | C3 | 4707 | D1 | 7652 | C3 |
| 2361 | A2 | 2760 | D1 | 3326 | B2 | 3680 | D3 | 4708 | D1 | 7656 | D3 |
| 2362 | A2 | 2761 | D1 | 3327 | A2 | 3684 | C3 | 4709 | D1 | 7661 | D3 |
| 2366 | A3 | 2762 | D1 | 3328 | B2 | 3685 | C2 | 4710 | D1 | 7701 | C1 |
| 2369 | B3 | 2763 | D1 | 3330 | B2 | 3686 | C3 | 4711 | C1 | 7702 | C1 |
| 2370 | B3 | 2764 | D1 | 3331 | B2 | 3687 | C2 | 4724 | D1 | 7708 | D1 |
| 2371 | A2 | 2766 | C1 | 3332 | B2 | 3688 | C2 | 4725 | D1 | 7713 | D1 |
| 2372 | A2 | 2770 | C1 | 3333 | B2 | 3689 | C2 | 4728 | D1 | 7716 | C1 |
| 2373 | A3 | 2786 | D1 | 3334 | B2 | 3690 | C2 | 4735 | D1 | | |
| 2374 | A2 | 2788 | C1 | 3336 | B2 | 3691 | C2 | 4736 | D1 | | |
| 2375 | A2 | 2792 | D1 | 3337 | B3 | 3696 | D2 | 4790 | D1 | | |
| 2378 | A2 | 2795 | D2 | 3340 | B2 | 3707 | C1 | 5404 | A2 | | |
| 2384 | A3 | 2900 | C3 | 3341 | B2 | 3708 | C1 | 5406 | A3 | | |
| 2412 | A2 | 2901 | C3 | 3342 | B2 | 3709 | C1 | 5408 | A2 | | |
| 2413 | A3 | 2902 | C3 | 3343 | B2 | 3710 | C1 | 5409 | B3 | | |
| 2420 | B3 | 2903 | C3 | 3344 | B2 | 3711 | C1 | 5410 | A2 | | |
| 2502 | C3 | 2904 | C3 | 3345 | B2 | 3712 | C1 | 5651 | D3 | | |
| 2503 | C2 | 2905 | C3 | 3346 | B3 | 3713 | C1 | 5652 | D3 | | |
| 2504 | C2 | 2906 | B3 | 3347 | B3 | 3718 | C1 | 5701 | D1 | | |
| 2505 | C2 | 2907 | C3 | 3348 | B3 | 3719 | C1 | 5703 | D1 | | |
| 2551 | C2 | 2908 | C3 | 3349 | B3 | 3720 | C1 | 5704 | C1 | | |
| 2610 | D2 | 2909 | C3 | 3350 | B3 | 3721 | C1 | 5705 | C1 | | |
| 2611 | D2 | 2910 | C3 | 3361 | B3 | 3722 | C1 | 5706 | C1 | | |
| 2629 | D2 | 2911 | C3 | 3362 | B2 | 3725 | C1 | 5708 | C1 | | |
| 2632 | D2 | 2912 | C3 | 3363 | B2 | 3730 | C1 | 5709 | C1 | | |
| 2634 | D2 | 2913 | C3 | 3364 | B2 | 3731 | C1 | 5710 | C1 | | |

## Layout SSB (Part 1 Tuner Side)



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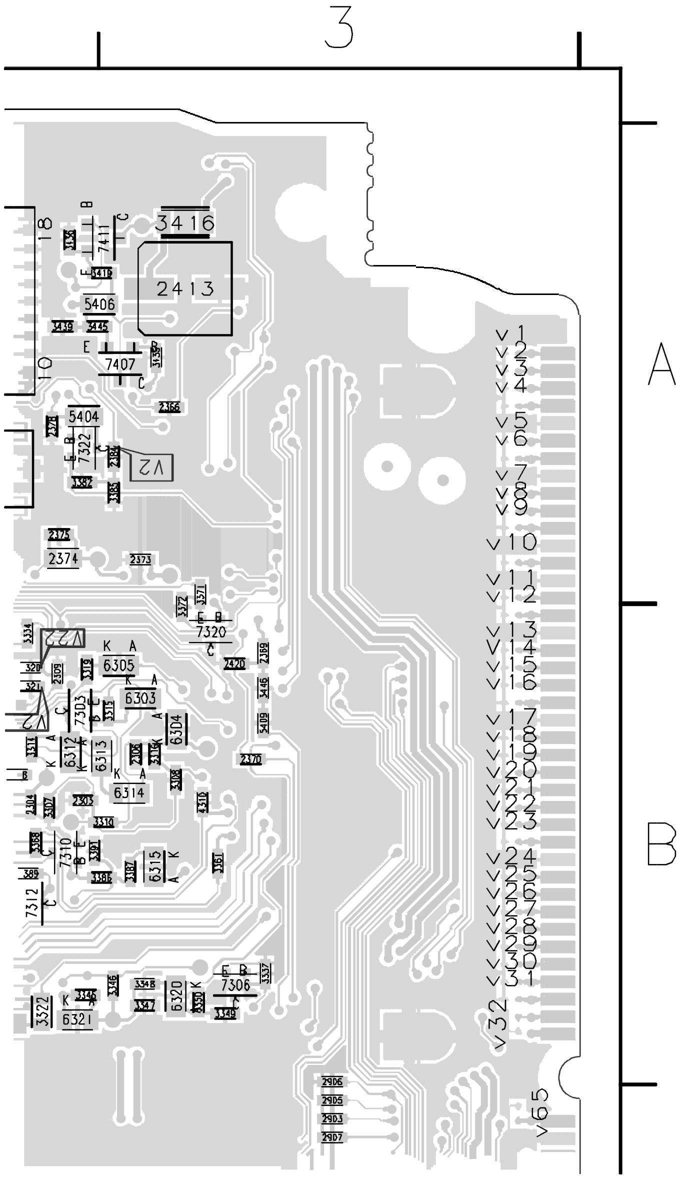
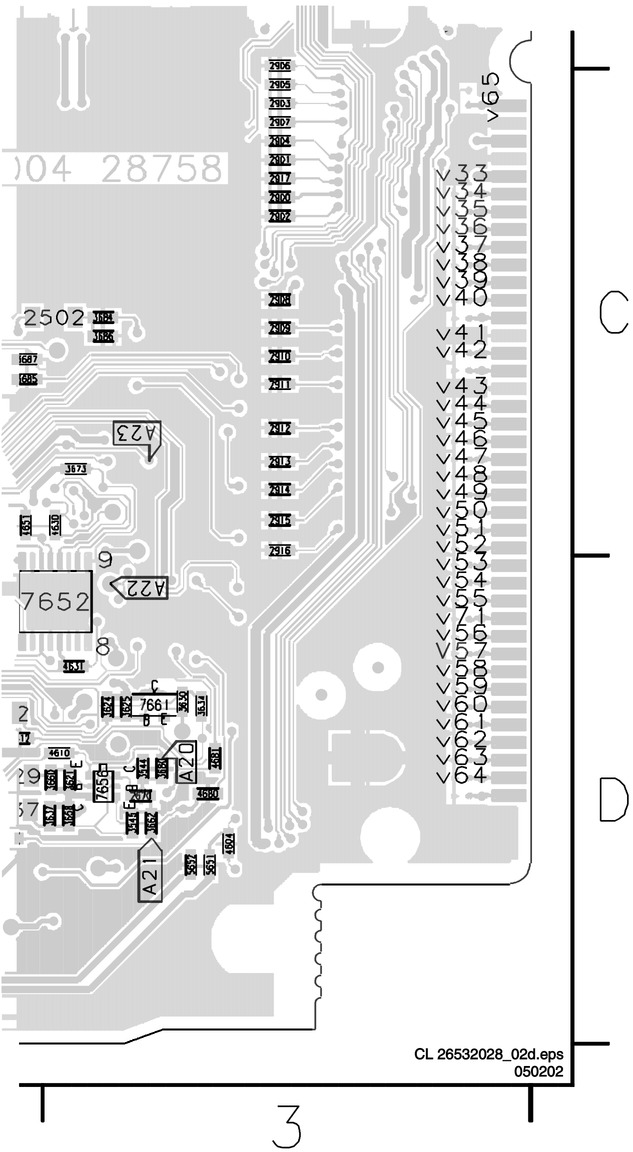
050202

## Layout SSB (Part 2 Tuner Side)


3
A
B
3416
2413
5406
7407
5404
7322
V2
2374
7320
6305
6303
6304
7305
6312
6313
6314
6315
7310
7312
7306
6320
6321
3322
v1
v2
v3
v4
v5
v6
v7
v8
v9
v10
v11
v12
v13
v14
v15
v16
v17
v18
v19
v20
v21
v22
v23
v24
v25
v26
v27
v28
v29
v30
v31
v32
v65

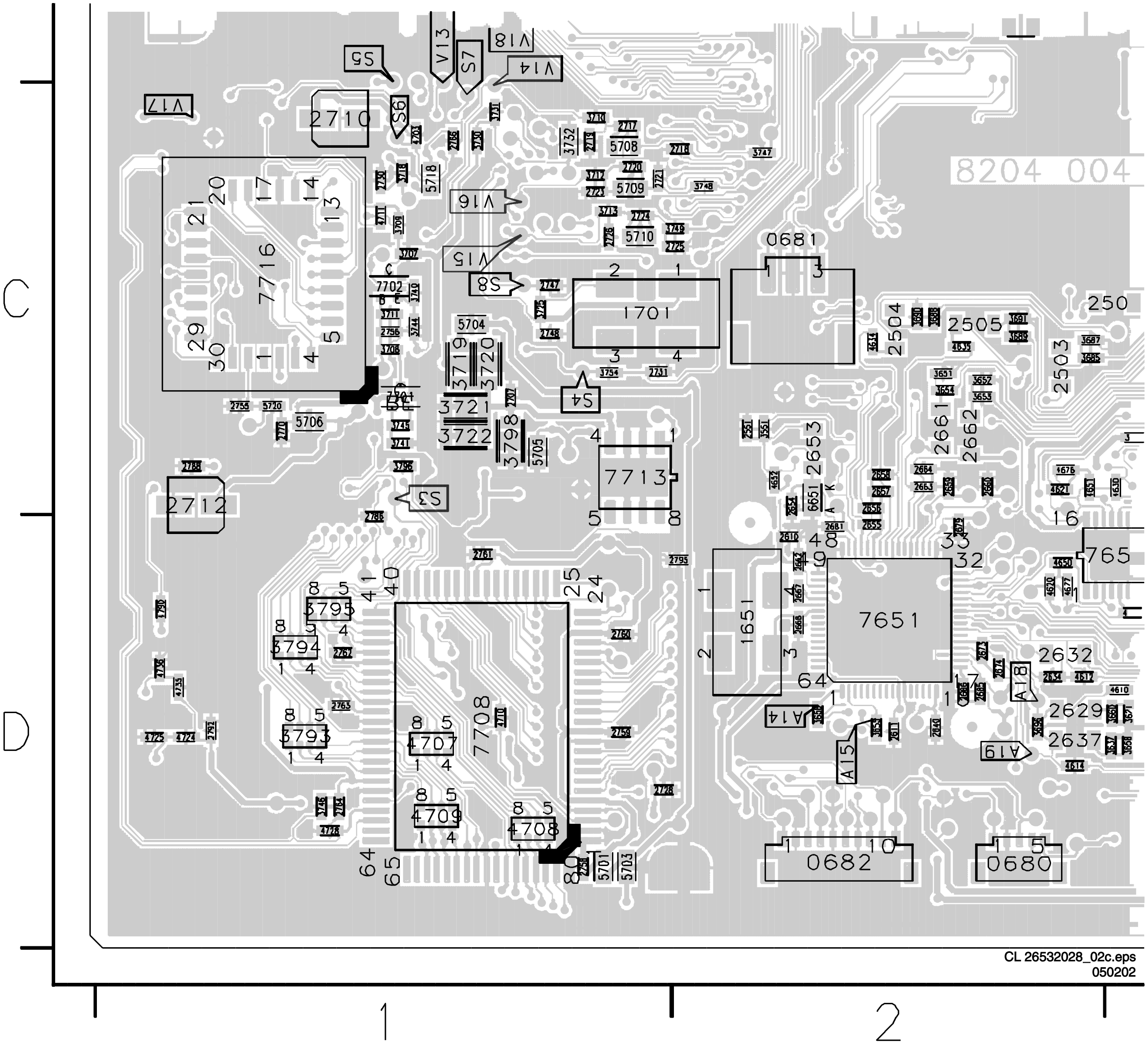
CL 26532028_02b.eps
050202

## Layout SSB (Part 4 Tuner Side)


004 28758
2502
A23
A22
7652
7661
A20
A21
7656
v65
v33
v34
v35
v36
v37
v38
v39
v40
v41
v42
v43
v44
v45
v46
v47
v48
v49
v50
v51
v52
v53
v54
v55
v71
v56
v57
v58
v59
v60
v61
v62
v63
v64
C
D
3

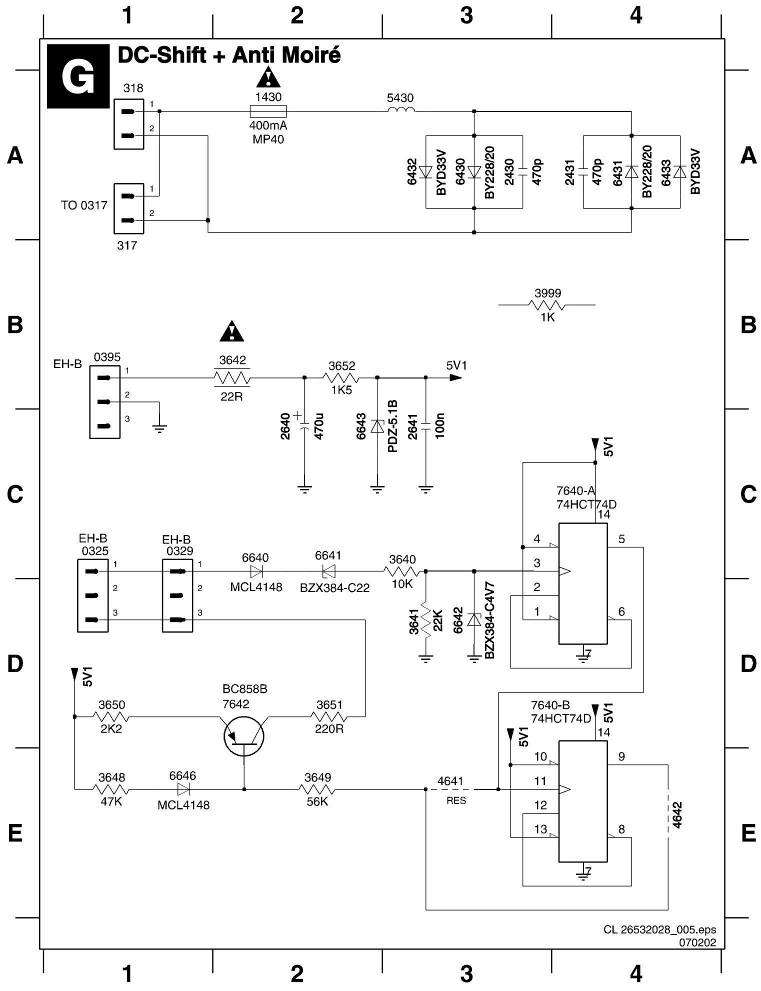
CL 26532028_02d.eps
050202

## Layout SSB (Part 3 Tuner Side)


C
D
1
2
V17
S5
V13
S7
V18
V14
2710
S6
8204 004
7716
V16
V15
S8
0681
1701
7702
5704
5708
5709
5710
5718
3732
3719
3720
3721
3722
3798
5705
S4
5706
2712
S3
7713
2505
2504
2503
250
2653
2661
2662
6651
7651
1651
2632
2629
2637
A18
A14
A15
A19
765
7708
3795
3794
3793
4707
4709
4708
0682
0680
5701
5703

CL 26532028_02c.eps
050202

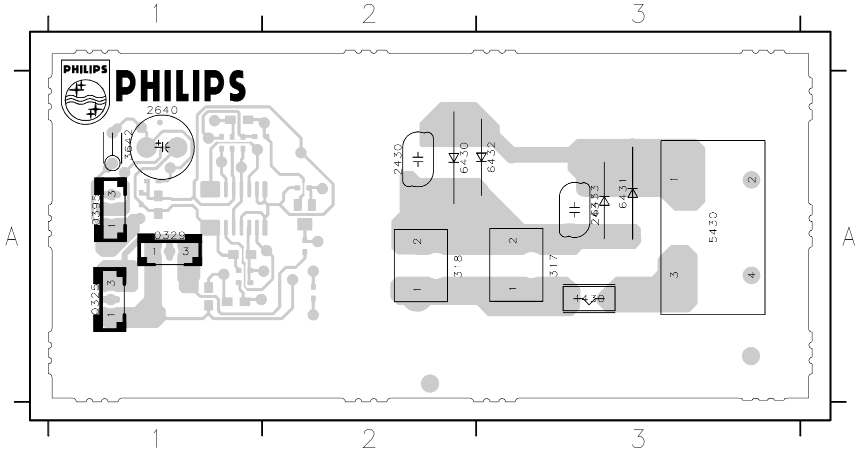
## DC-Shift + Anti Moiré


G
DC-Shift + Anti Moiré
1
2
3
4
A
B
C
D
E
318
TO 0317
317
1430
400mA
MP40
5430
6432
BYD33V
6430
BY228/20
2430
470p
2431
470p
6431
BY228/20
6433
BYD33V
3999
1K
EH-B
0395
3642
22R
3652
1K5
5V1
2640
470u
6643
PDZ-5.1B
2641
100n
7640-A
74HCT74D
EH-B
0325
EH-B
0329
6640
MCL4148
6641
BZX384-C22
3640
10K
3641
22K
6642
BZX384-C4V7
BC858B
7642
3650
2K2
3651
220R
3648
47K
6646
MCL4148
3649
56K
4641
RES
7640-B
74HCT74D
4642
CL 26532028_005.eps
070202

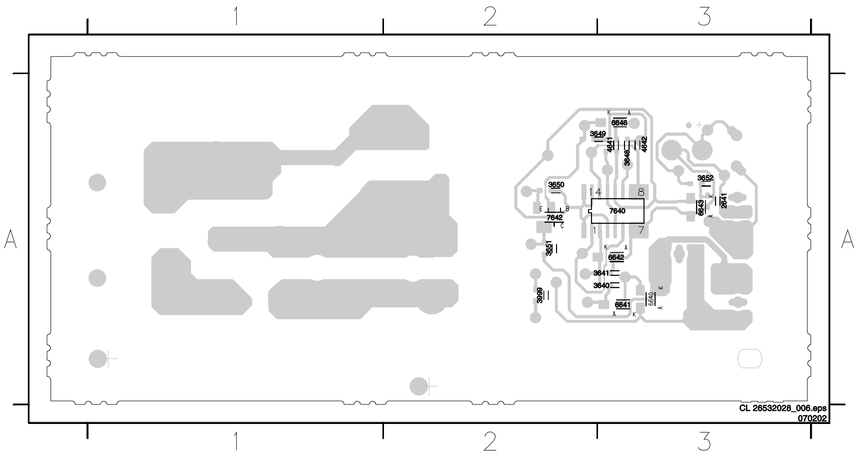
| | |
|---|---|
| 317 | B1 |
| 318 | A1 |
| 0325 | C1 |
| 0329 | C1 |
| 0395 | B1 |
| 1430 | A2 |
| 2430 | A3 |
| 2431 | A4 |
| 2640 | C2 |
| 2641 | C3 |
| 3640 | C3 |
| 3641 | D3 |
| 3642 | B2 |
| 3648 | E1 |
| 3649 | E2 |
| 3650 | D1 |
| 3651 | D2 |
| 3652 | B2 |
| 3999 | B3 |
| 4641 | E3 |
| 4642 | E4 |
| 5430 | A3 |
| 6430 | A3 |
| 6431 | A4 |
| 6432 | A3 |
| 6433 | A4 |
| 6640 | C2 |
| 6641 | C2 |
| 6642 | D3 |
| 6643 | C2 |
| 6646 | E1 |
| 7640-A | C4 |
| 7640-B | D3 |
| 7642 | D2 |

## Layout DC-Shift + Anti Moiré

| | |
|---|---|
| 0317 | A3 |
| 0318 | A2 |
| 0325 | A1 |
| 0329 | A1 |
| 0395 | A1 |
| 1430 | A3 |
| 2430 | A2 |
| 2431 | A3 |
| 2640 | A1 |
| 3642 | A1 |
| 5430 | A3 |
| 6430 | A2 |
| 6431 | A3 |
| 6432 | A3 |
| 6433 | A3 |


1
2
3
A
PHILIPS
2640
3642
0395
0329
0325
2430
6430
6432
2643
6431
318
317
1430
5430

| | |
|---|---|
| 0317 | A1 |
| 0318 | A2 |
| 0325 | A3 |
| 0329 | A3 |
| 0395 | A3 |
| 1430 | A1 |
| 2430 | A2 |
| 2431 | A1 |
| 2640 | A3 |
| 2641 | A3 |
| 3640 | A3 |
| 3641 | A3 |
| 3642 | A3 |
| 3648 | A3 |
| 3649 | A3 |
| 3650 | A2 |
| 3651 | A2 |
| 3652 | A3 |
| 3999 | A2 |
| 4641 | A3 |
| 4642 | A3 |
| 5430 | A1 |
| 6430 | A2 |
| 6431 | A1 |
| 6432 | A1 |
| 6433 | A1 |
| 6640 | A3 |
| 6641 | A3 |
| 6642 | A3 |
| 6643 | A3 |
| 6646 | A3 |
| 7640 | A3 |
| 7642 | A2 |


1
2
3
A
3649
6646
3650
3652
7640
7642
6642
3641
3640
3999
6641
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070202

**Personal Notes:**

**Personal Notes:**

**Colour television**

**Chassis**

# EM2E

## AA 02.02

Service
Service
**Service**

# Service Information

### New Side I/O, Top Control and Mains Switch Panel

In week 225 the following panels are introduced in the set 29PT8607:

- Mains Switch Panel **[K]**
- Side I/O Panel **[L]**
- Top Control Panel **[M]**

In this service information the (changed) schematics, PCB layouts and spare parts list are given. To use the existing Block diagrams, wiring diagrams, $I^2C$ overviews, supply line overview and chassis overview the schematics character **[E]** has to be replaced by **[K]**, **[O]** by **[L]** and **[P]** by **[M]**.

### Neues Side I/O, Top Control und Mains Switch Panel

In der Woche 225 wurden folgende neue Platinen zusammen mit dem Modell 29PT8607 introduziert:

- Netzschalterplatine (Main-Switch-Panel) **[K]**
- Seitliche E/A-Platine (Side I/O-Panel) **[L]**
- Lokale Ortsbedienung (Top Control Panel) **[M]**

Mit dieser Serviceinformation werden die (änderten) zugehörigen Schaltbilder, das Platinenlayout und die Ersatzteil-Stücklisten veröffentlicht. Um die bereits bestehenden Block- und Verkabelungsdiagramme, die $I^2C$-Bus-Übersicht sowie die Übersichten der Spannungsversorgungsleitungen bzw. der Chassisausführungen weiter nutzen zu können müssen folgenden Einzelschaltbilder ersetzt werden: Diagramm **[E]** durch Diagramm **[K]**, **[O]** durch **[L]** und Diagramm **[P]** durch **[M]**.

### Nouvelles platines E/S, Commande supérieure, Platine Commutateur Secteur.

Depuis la semaine 225 les platines suivantes sont introduites dans l'appareil 29PT8607:

- Platine commutateur secteur **[K]**
- Platine E/S de coté **[L]**
- Platine de Commandes en partie supérieure **[M]**

Cette information service done les schémas, implantations et liste des pièces correspondant. Pour utiliser les schémas bloc, de cablage, $I^2C$, alimentation et vue d'ensemble du châssis les repères de schéma **[E]** doivent être remplacés par **[K]**, **[O]** par **[L]** et **[P]** par **[M]**.

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**PHILIPS**

# Spare parts list

## Mains Switch Panel [K]

### Various

| | | |
|---|---|---|
| 0157▲ | 3104 311 02421 | Cable 5p 480mm |
| 0177▲ | 3104 311 03011 | Cable 2p 340mm |
| 0201 | 2422 025 16268 | 2p male |
| 0202 | 2422 025 16268 | 2p male |
| 0203 | 2422 025 06353 | 5p male |
| 1910 | 9322 127 54667 | IR receiver TSOP1836UH1 |
| 1951 | 2422 128 02972 | Power switch |

⊣⊢

| | | |
|---|---|---|
| 2930 | 4822 124 41584 | 100µF 20% 10V |
| 2931 | 4822 124 41796 | 22µF 20% 16V |
| 2932 | 4822 124 11913 | 22nF 20% 275V |

▭

| | | |
|---|---|---|
| 3957 | 4822 053 21335 | 3.3MΩ 5% 0.5W |
| 3966 | 4822 053 21335 | 3.3MΩ 5% 0.5W |
| 3978 | 4822 051 30101 | 100Ω 5% 62mW |
| 3981 | 4822 051 30392 | 3kΩ9 5% 63mW |
| 3982 | 4822 116 52219 | 330Ω 5% 0.5W |
| 3985 | 4822 117 13632 | 100kΩ 1% 620mW |
| 3986 | 4822 051 30221 | 220Ω 5% 62mW |
| 3988 | 4822 051 30479 | 47Ω 5% 62mW |
| 3989 | 4822 051 30102 | 1kΩ 5% 62mW |
| 3990 | 4822 117 13632 | 100kΩ 1% 620mW |
| 3991 | 4822 050 11002 | 1kΩ 1% 0.4W |

▶|

| | | |
|---|---|---|
| 6901 | 9322 050 99682 | LTL-10224WHCR |
| 6954 | 4822 130 30621 | 1N4148 |

⊗ ▥

| | | |
|---|---|---|
| 7900 | 3198 010 42320 | BC857BW |
| 7901 | 3198 010 42310 | BC847BW |
| 7902 | 4822 130 11418 | TCDT1102G |

## Side I/O panel [L]

### Various

| | | |
|---|---|---|
| 0240 | 2422 025 12485 | Conn 11P |
| 1254 | 4822 267 31014 | Headphone socket |
| 1255 | 4822 265 11606 | Conn 3P |

⊣⊢

| | | |
|---|---|---|
| 2286 | 4822 122 33642 | 150pF 5% 50V |
| 2288 | 4822 122 33642 | 150pF 5% 50V |
| 2292 | 5322 122 32311 | 470pF 10% 100V |
| 2294 | 5322 122 32311 | 470pF 10% 100V |
| 2296 | 4822 122 30043 | 10nF 80% 63V |
| 2297 | 4822 122 30043 | 10nF 80% 63V |

▭

| | | |
|---|---|---|
| 3285 | 4822 116 52201 | 75Ω 5% 0.5W |
| 3286 | 4822 116 52176 | 10Ω 5% 0.5W |
| 3287 | 4822 116 52201 | 75Ω 5% 0.5W |
| 3288 | 4822 116 52176 | 10Ω 5% 0.5W |
| 3289 | 4822 116 52249 | 1k8 5% 0.5W |
| 3291 | 4822 050 11002 | 1k 1% 0.4W |
| 3292 | 4822 117 10834 | 47k 1% 0.1W |
| 3293 | 4822 050 11002 | 1k 1% 0.4W |
| 3294 | 4822 117 10834 | 47k 1% 0.1W |
| 3295 | 4822 116 52276 | 3k9 5% 0.5W |
| 3296 | 4822 117 10833 | 10k 1% 0.1W |
| 3297 | 4822 117 10833 | 10k 1% 0.1W |

▶|

| | | |
|---|---|---|
| 6291 | 9340 548 61115 | PDZ12B |
| 6292 | 9340 548 61115 | PDZ12B |
| 6293 | 9340 548 61115 | PDZ12B |
| 6294 | 9340 548 61115 | PDZ12B |

## Top Control Panel [M]

### Various

| | | |
|---|---|---|
| 0215 | 4822 267 10748 | 3P |
| 1091 | 4822 276 13775 | Switch |
| 1092 | 4822 276 13775 | Switch |
| 1093 | 4822 276 13775 | Switch |
| 1094 | 4822 276 13775 | Switch |

▭

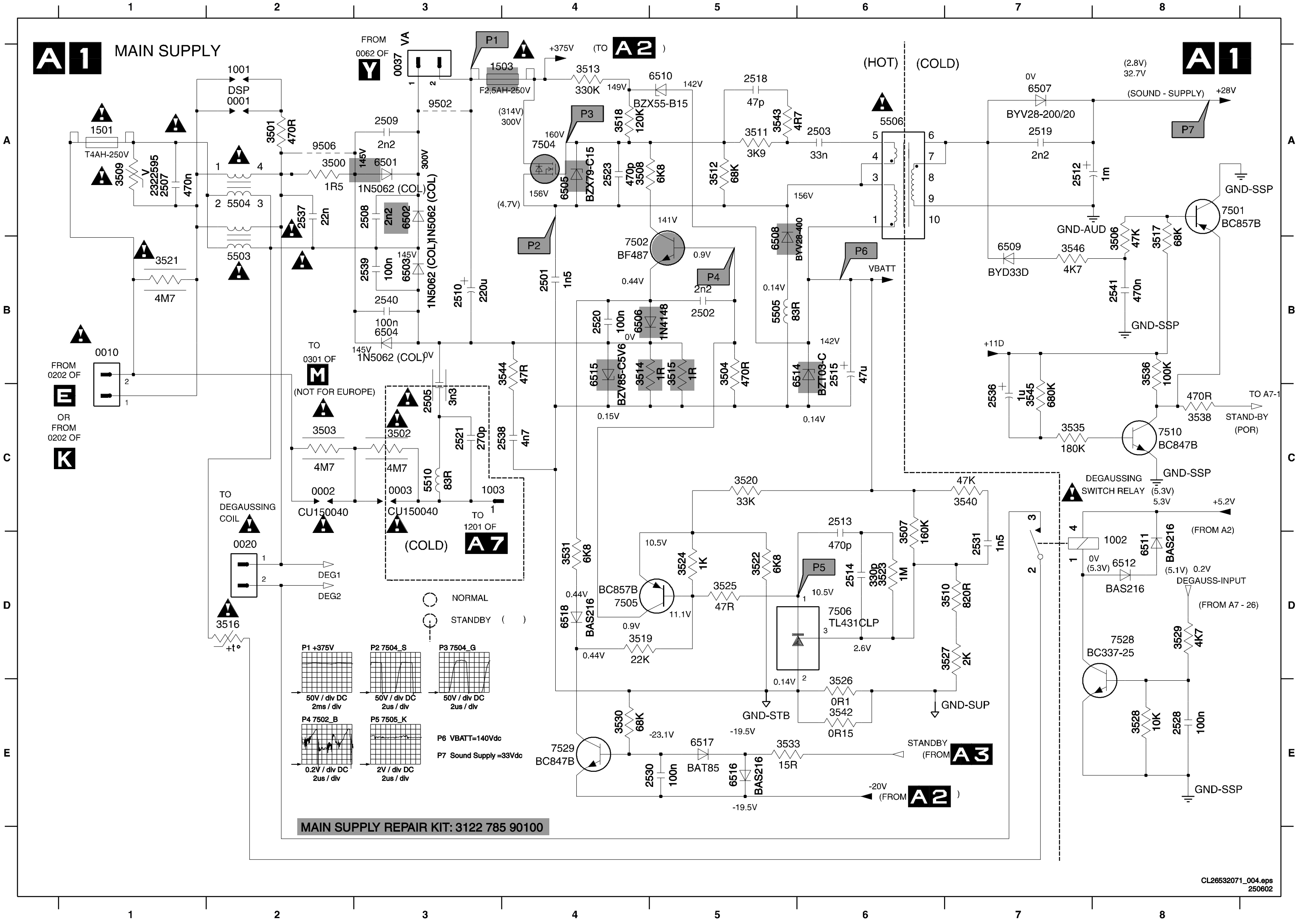
| | | |
|---|---|---|
| 3091 | 4822 051 20561 | 560Ω 5% 0.1W |
| 3092 | 4822 051 20391 | 390Ω 5% 0.1W |
| 3093 | 4822 051 20561 | 560Ω 5% 0.1W |
| 3094 | 4822 117 11504 | 270Ω 1% 0.1W |
| 3095 | 4822 051 20332 | 3k3 5% 0.1W |
| 3096 | 4822 117 11139 | 1k5 1% 0.1W |

▶|

| | | |
|---|---|---|
| 6091 | 4822 130 31983 | BAT85 |
| 8345 | 4822 320 12511 | 3P 1500mm |

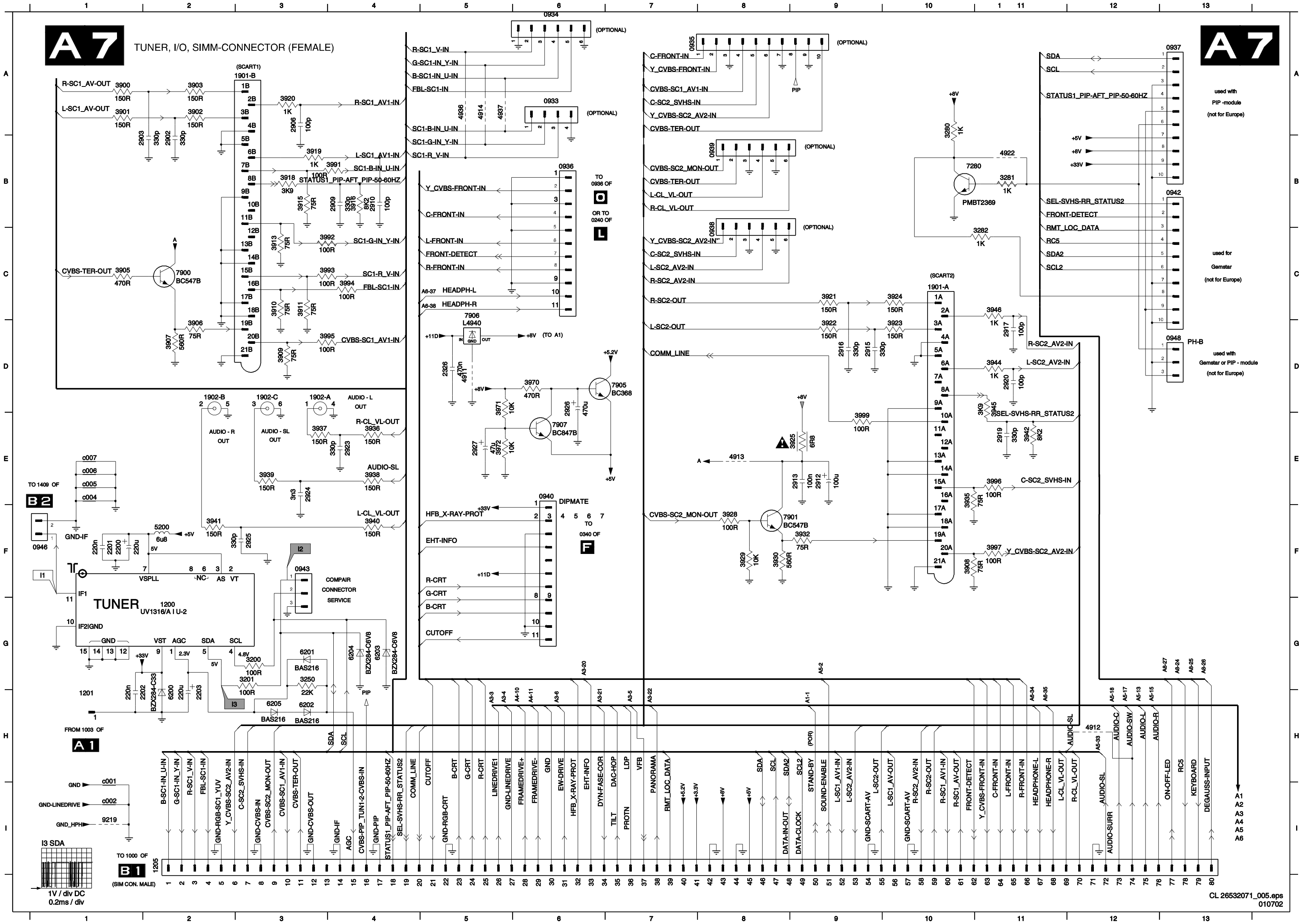
# Electrical Diagrams and PWB's

## Large Signal Panel: Main Supply


A1 MAIN SUPPLY
1 2 3 4 5 6 7 8
A B C D E
1501
T4AH-250V
3509
2322595
2507 470n
1001 DSP 0001
3501 470R
9506
3500 1R5
6501 1N5062 (COL)
5504
5503
2537 22n
3521 4M7
FROM 0062 OF Y
0037 VA
9502
2509 2n2
2508 2n2 6502
1N5062 (COL)
2539 100n 6503
2540 100n
6504 1N5062 (COL)
2510 220u
300V
P1
1503 F2,5AH-250V
+375V
(TO A2)
3513 330K
6510 BZX55-B15
142V
149V
(314V) 300V
P3
7504
160V
6505 BZX79-C15
2523 470p
3518 120K
3508 6K8
(4.7V)
156V
P2
2501 1n5
141V
7502 BF487
0.9V
0.44V
P4
2502 2n2
2520 100n
6506 1N4148
6515 BZV85-C5V6
3514 1R
3515 1R
3504 470R
3544 47R
2538 4n7
0.15V
2518 47p
3543 4R7
3511 3K9
2503 33n
3512 68K
6508 BYV28-400
156V
5505 83R
0.14V
142V
6514 BZT03-C
2515 47u
P6 VBATT
(HOT) (COLD)
5506
1 3 4 5 6 7 8 9 10
0010
FROM 0202 OF E
OR FROM 0202 OF K
TO 0301 OF M
(NOT FOR EUROPE)
2505 3n3
2521 270p
5510 83R
3503 4M7
3502 4M7
0002 CU150040
0003 CU150040
1003
TO 1201 OF A7
(COLD)
TO DEGAUSSING COIL
0020
DEG1 DEG2
3516
NORMAL
STANDBY ( )
P1 +375V
P2 7504_S
P3 7504_G
50V / div DC 2ms / div
50V / div DC 2us / div
50V / div DC 2us / div
P4 7502_B
P5 7505_K
0.2V / div DC 2us / div
2V / div DC 2us / div
P6 VBATT=140Vdc
P7 Sound Supply =33Vdc
MAIN SUPPLY REPAIR KIT: 3122 785 90100
3520 33K
10.5V
3531 6K8
3524 1K
3522 6K8
BC857B 7505
3525 47R
11.1V
0.44V
6518 BAS216
0.9V
3519 22K
P5
2513 470p
2514 330p
3523 1M
3507 160K
10.5V
7506 TL431CLP
2.6V
0.14V
3526 0R1
3542 0R15
GND-STB
GND-SUP
3530 68K
-23.1V
7529 BC847B
6517 BAT85
2530 100n
6516 BAS216
-19.5V
3533 15R
STANDBY (FROM A3)
-20V (FROM A2)
-19.5V
47K 3540
2531 1n5
3510 820R
3527 2K
0V
6507 BYV28-200/20
(2.8V) 32.7V
(SOUND - SUPPLY) +28V
P7
2519 2n2
2512 1m
GND-AUD
6509 BYD33D
3546 4K7
3506 47K
3517 68K
2541 470n
GND-SSP
7501 BC857B
+11D
2536 1u
3545 680K
3536 100K
470R 3538
TO A7-1 STAND-BY (POR)
3535 180K
7510 BC847B
DEGAUSSING SWITCH RELAY
(5.3V) 5.3V
+5.2V
1002
6511 BAS216
(FROM A2)
0V (5.3V)
6512 BAS216
(5.1V) 0.2V
DEGAUSS-INPUT
(FROM A7 - 26)
7528 BC337-25
3529 4K7
3528 10K
2528 100n
CL26532071_004.eps
250602

| | |
|---|---|
| 0001 | A2 |
| 0002 | C2 |
| 0003 | C3 |
| 0010 | B1 |
| 0020 | D2 |
| 0037 | A3 |
| 1001 | A2 |
| 1002 | D8 |
| 1003 | C4 |
| 1501 | A1 |
| 1503 | A3 |
| 2501 | B4 |
| 2502 | B5 |
| 2503 | A6 |
| 2505 | C3 |
| 2507 | A1 |
| 2508 | A3 |
| 2509 | A3 |
| 2510 | B3 |
| 2512 | A7 |
| 2513 | C6 |
| 2514 | D6 |
| 2515 | B6 |
| 2518 | A5 |
| 2519 | A7 |
| 2520 | B4 |
| 2521 | C3 |
| 2523 | A4 |
| 2528 | E8 |
| 2530 | E5 |
| 2531 | D7 |
| 2536 | C7 |
| 2537 | A2 |
| 2538 | C4 |
| 2539 | B3 |
| 2540 | B3 |
| 2541 | B8 |
| 3500 | A2 |
| 3501 | A2 |
| 3502 | C3 |
| 3503 | C2 |
| 3504 | B5 |
| 3506 | B8 |
| 3507 | D6 |
| 3508 | A4 |
| 3509 | A1 |
| 3510 | D7 |
| 3511 | A5 |
| 3512 | A5 |
| 3513 | A4 |
| 3514 | B4 |
| 3515 | B5 |
| 3516 | D2 |
| 3517 | B8 |
| 3518 | A4 |
| 3519 | D4 |
| 3520 | C5 |
| 3521 | B1 |
| 3522 | D5 |
| 3523 | D6 |
| 3524 | D5 |
| 3525 | D5 |
| 3526 | E6 |
| 3527 | D7 |
| 3528 | E8 |
| 3529 | D8 |
| 3530 | E4 |
| 3531 | D4 |
| 3533 | E5 |
| 3535 | C7 |
| 3536 | B8 |
| 3538 | C8 |
| 3540 | C7 |
| 3542 | E6 |
| 3543 | A5 |
| 3544 | B4 |
| 3545 | C7 |
| 3546 | B7 |
| 5503 | B2 |
| 5504 | A2 |
| 5505 | B5 |
| 5506 | A6 |
| 5510 | C3 |
| 6501 | A3 |
| 6502 | A3 |
| 6503 | B3 |
| 6504 | B3 |
| 6505 | A4 |
| 6506 | B4 |
| 6507 | A7 |
| 6508 | B5 |
| 6509 | B7 |
| 6510 | A5 |
| 6511 | D8 |
| 6512 | D8 |
| 6514 | B6 |
| 6515 | B4 |
| 6516 | E5 |
| 6517 | E5 |
| 6518 | D4 |
| 7501 | A8 |
| 7502 | B4 |
| 7504 | A4 |
| 7505 | D4 |
| 7506 | D6 |
| 7510 | C8 |
| 7528 | D8 |
| 7529 | E4 |
| 9502 | A3 |
| 9506 | A2 |

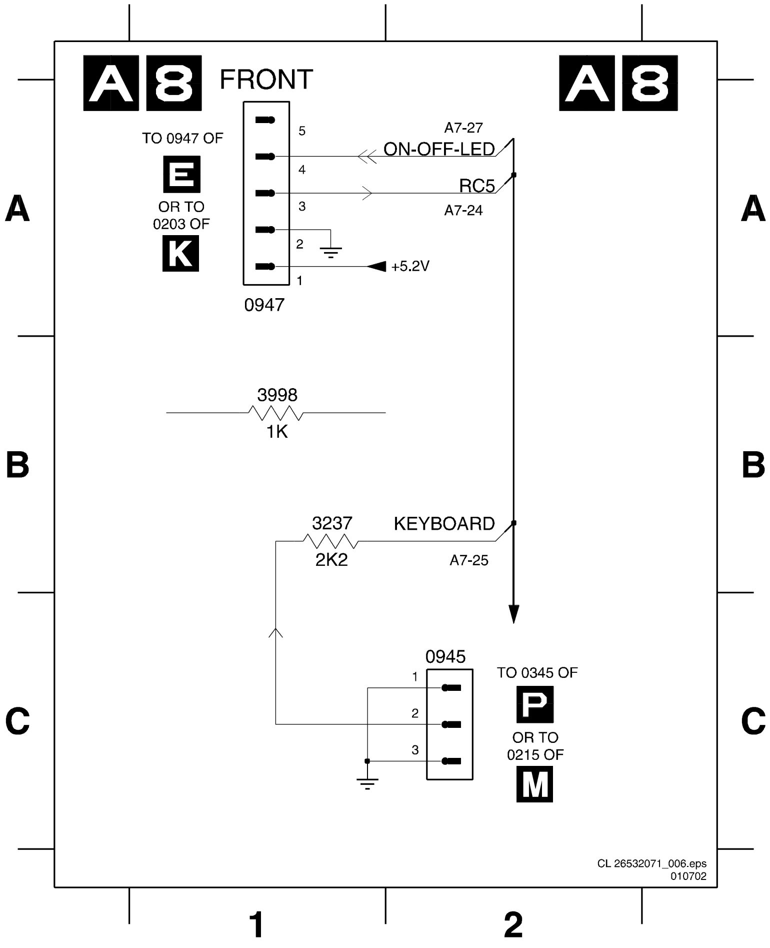
## Large Signal Panel: Tuner, I/O, SIMM Connector (Female)


A7
TUNER, I/O, SIMM-CONNECTOR (FEMALE)
(SCART1)
1901-B
R-SC1_AV-OUT
L-SC1_AV-OUT
CVBS-TER-OUT
7900
BC547B
R-SC1_AV1-IN
L-SC1_AV1-IN
SC1-B-IN_U-IN
STATUS1_PIP-AFT_PIP-50-60HZ
SC1-G-IN_Y-IN
SC1-R_V-IN
FBL-SC1-IN
CVBS-SC1_AV1-IN
R-SC1_V-IN
G-SC1-IN_Y-IN
B-SC1-IN_U-IN
0934
0933
(OPTIONAL)
0935
C-FRONT-IN
Y_CVBS-FRONT-IN
CVBS-SC1_AV1-IN
C-SC2_SVHS-IN
Y_CVBS-SC2_AV2-IN
CVBS-TER-OUT
PIP
0939
CVBS-SC2_MON-OUT
L-CL_VL-OUT
R-CL_VL-OUT
0938
L-SC2_AV2-IN
R-SC2_AV2-IN
R-SC2-OUT
L-SC2-OUT
COMM_LINE
0936
TO 0936 OF
O
OR TO 0240 OF
L
FRONT-DETECT
R-FRONT-IN
L-FRONT-IN
HEADPH-L
HEADPH-R
7906
L4940
+8V (TO A1)
7905
BC368
7907
BC847B
1902-B
1902-C
1902-A
AUDIO - R OUT
AUDIO - SL OUT
AUDIO - L OUT
R-CL_VL-OUT
AUDIO-SL
L-CL_VL-OUT
TO 1409 OF
B2
GND-IF
0946
5200
6u8
TUNER
1200
UV1316/A I U-2
VSPLL
NC
AS
VT
IF1
IF2IGND
GND
VST
AGC
SDA
SCL
0943
COMPAIR CONNECTOR SERVICE
BAS216
6201
6202
6205
BZX284-C6V8
6203
6204
1201
FROM 1003 OF
A1
0940
DIPMATE
TO 0340 OF
F
HFB_X-RAY-PROT
EHT-INFO
R-CRT
G-CRT
B-CRT
CUTOFF
0937
SDA
SCL
STATUS1_PIP-AFT_PIP-50-60HZ
used with PIP-module (not for Europe)
7280
PMBT2369
4922
0942
SEL-SVHS-RR_STATUS2
RMT_LOC_DATA
RC5
SDA2
SCL2
used for Gemstar (not for Europe)
0948
PH-B
used with Gemstar or PIP-module (not for Europe)
(SCART2)
1901-A
7901
BC547B
4913
C-SC2_SVHS-IN
Y_CVBS-SC2_AV2-IN
4912
AUDIO-C
AUDIO-SW
AUDIO-L
AUDIO-R
GND
GND-LINEDRIVE
GND_HPH
9219
I3 SDA
1V / div DC
0.2ms / div
TO 1000 OF
B1
(SIM CON. MALE)
1205
B-SC1-IN_U-IN
G-SC1-IN_Y-IN
R-SC1_V-IN
FBL-SC1-IN
GND-RGB-SC1_YUV
Y_CVBS-SC2_AV2-IN
C-SC2_SVHS-IN
GND-CVBS-IN
CVBS-SC2_MON-OUT
CVBS-SC1_AV1-IN
CVBS-TER-OUT
GND-CVBS-OUT
GND-IF
AGC
CVBS-PIP_TUN1-2-CVBS-IN
GND-PIP
STATUS1_PIP-AFT_PIP-50-60HZ
SEL-SVHS-RR_STATUS2
COMM_LINE
CUTOFF
GND-RGB-CRT
B-CRT
G-CRT
R-CRT
LINEDRIVE1
GND-LINEDRIVE
FRAMEDRIVE+
FRAMEDRIVE-
GND
EW-DRIVE
HFB_X-RAY-PROT
EHT-INFO
DYN-FASE-COR
TILT
DAC-HOP
PROTN
LDP
VFB
PANORAMA
RMT_LOC_DATA
+5.2V
+3.3V
+8V
+5V
SDA
SCL
DATA-IN-OUT
SDA2
DATA-CLOCK
SCL2
STAND-BY
SOUND-ENABLE
L-SC1_AV1-IN
L-SC2_AV2-IN
GND-SCART-AV
L-SC2-OUT
L-SC1_AV-OUT
GND-SCART-AV
R-SC2_AV2-IN
R-SC2-OUT
R-SC1_AV1-IN
R-SC1_AV-OUT
FRONT-DETECT
Y_CVBS-FRONT-IN
C-FRONT-IN
L-FRONT-IN
R-FRONT-IN
HEADPHONE-L
HEADPHONE-R
L-CL_VL-OUT
R-CL_VL-OUT
AUDIO-SL
AUDIO-SURR
ON-OFF-LED
RC5
KEYBOARD
DEGAUSS-INPUT
A1
A2
A3
A4
A5
A6
CL 26532071_005.eps
010702

| | |
|---|---|
| 0933 | A6 |
| 0934 | A6 |
| 0935 | A7 |
| 0936 | B6 |
| 0937 | A13 |
| 0938 | C8 |
| 0939 | B8 |
| 0940 | E6 |
| 0942 | B13 |
| 0943 | F3 |
| 0946 | F1 |
| 0948 | D13 |
| 1200 | G2 |
| 1201 | H1 |
| 1205 | I2 |
| 1901-A | C10 |
| 1901-B | A2 |
| 1902-A | D3 |
| 1902-B | D2 |
| 1902-C | D3 |
| 2200 | F1 |
| 2201 | F1 |
| 2202 | H1 |
| 2203 | H2 |
| 2902 | B2 |
| 2903 | B2 |
| 2906 | A3 |
| 2909 | B4 |
| 2910 | B4 |
| 2912 | E9 |
| 2913 | E9 |
| 2915 | D9 |
| 2916 | D9 |
| 2917 | D11 |
| 2919 | E11 |
| 2920 | D11 |
| 2923 | E4 |
| 2924 | E3 |
| 2925 | F3 |
| 2926 | D6 |
| 2927 | E5 |
| 3200 | G3 |
| 3201 | G3 |
| 3250 | G3 |
| 3280 | A10 |
| 3281 | B11 |
| 3282 | C11 |
| 3900 | A1 |
| 3901 | A1 |
| 3902 | A2 |
| 3903 | A2 |
| 3905 | C1 |
| 3906 | D2 |
| 3907 | D2 |
| 3908 | F10 |
| 3909 | D3 |
| 3910 | C3 |
| 3911 | C3 |
| 3913 | C3 |
| 3915 | B3 |
| 3916 | B4 |
| 3918 | B3 |
| 3919 | B3 |
| 3920 | A3 |
| 3921 | C9 |
| 3922 | D9 |
| 3923 | D10 |
| 3924 | C10 |
| 3925 | E9 |
| 3928 | F8 |
| 3929 | F8 |
| 3930 | F8 |
| 3932 | F9 |
| 3935 | E10 |
| 3936 | E4 |
| 3937 | E3 |
| 3938 | E4 |
| 3939 | E3 |
| 3940 | F4 |
| 3941 | F2 |
| 3942 | E11 |
| 3944 | D11 |
| 3945 | D11 |
| 3946 | C11 |
| 3970 | D6 |
| 3971 | D5 |
| 3972 | E5 |
| 3991 | B4 |
| 3992 | C3 |
| 3993 | C3 |
| 3994 | C4 |
| 3995 | D3 |
| 3996 | E11 |
| 3997 | F11 |
| 3999 | E9 |
| 4911 | D5 |
| 4912 | H12 |
| 4913 | E8 |
| 4914 | A5 |
| 4922 | B11 |
| 4934 | A12 |
| 4936 | A5 |
| 4937 | A5 |
| 5200 | F2 |
| 6200 | H2 |
| 6201 | G3 |
| 6202 | H3 |
| 6203 | G4 |
| 6204 | G4 |
| 6205 | H3 |
| 7280 | B11 |
| 7900 | C2 |
| 7901 | F8 |
| 7905 | D7 |
| 7906 | C5 |
| 7907 | E6 |

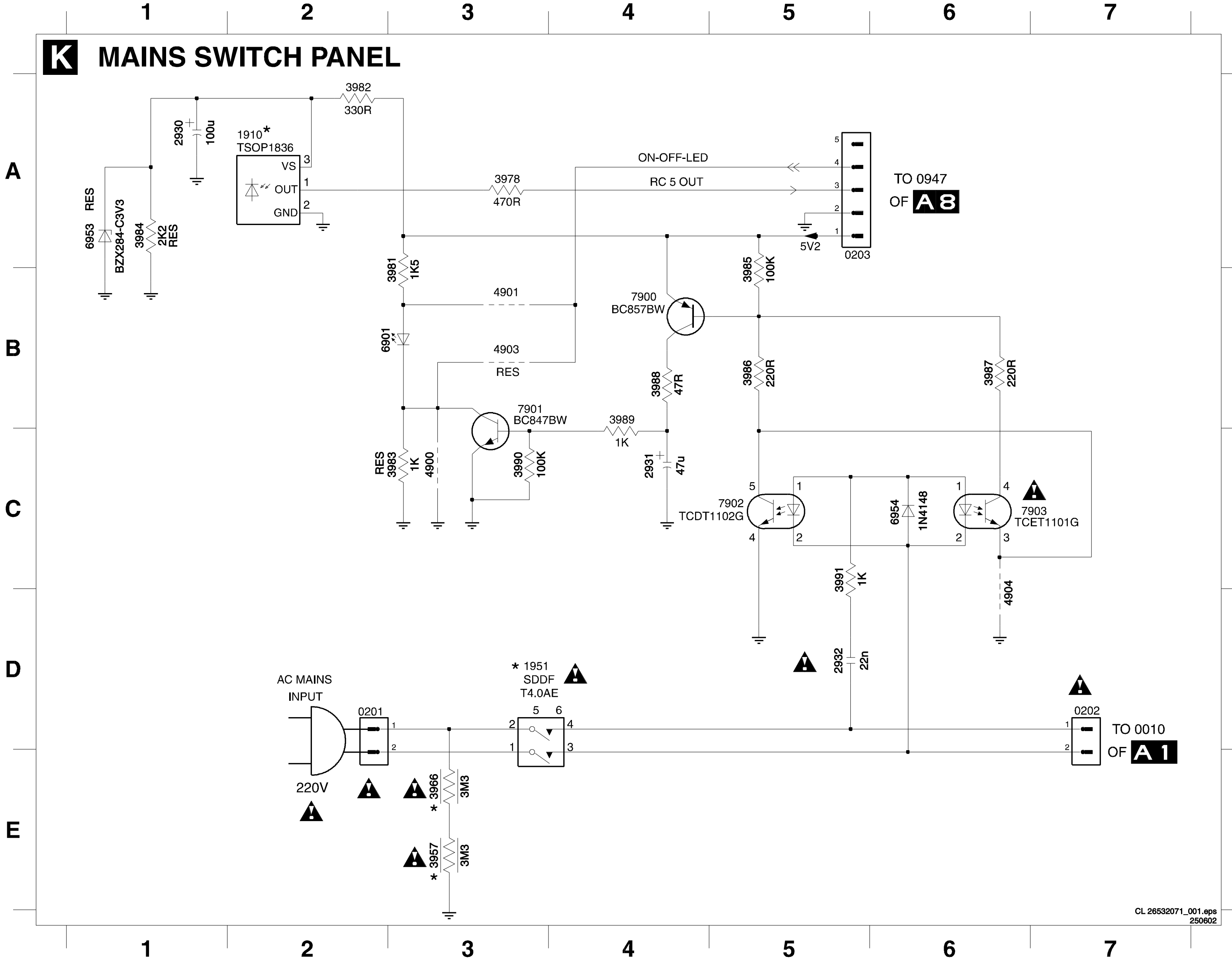
## Large Signal Panel: Front

**0945 C2**
**0947 A1**
**3237 B1**
**3998 B1**



A8 FRONT
A8
TO 0947 OF
E
OR TO
0203 OF
K
5
4
3
2
1
0947
A7-27
ON-OFF-LED
RC5
A7-24
+5.2V
3998
1K
3237
2K2
KEYBOARD
A7-25
0945
1
2
3
TO 0345 OF
P
OR TO
0215 OF
M
A
B
C
1
2
CL 26532071_006.eps
010702

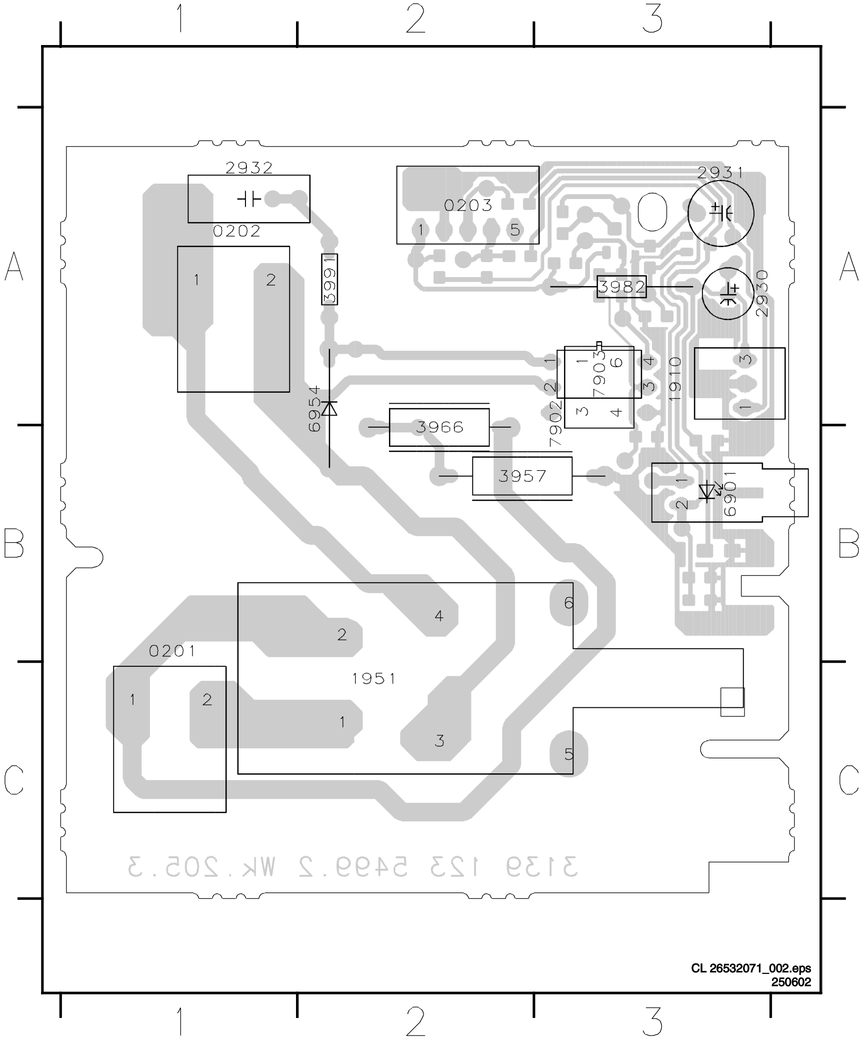
### Mains Switch Panel


1
2
3
4
5
6
7
A
B
C
D
E
K
MAINS SWITCH PANEL
3982
330R
2930
100u
1910*
TSOP1836
VS
OUT
GND
3
1
2
ON-OFF-LED
3978
470R
RC 5 OUT
5
4
3
2
1
5V2
0203
TO 0947
OF A8
6953
RES
BZX284-C3V3
3984
2K2
RES
3981
1K5
4901
4903
RES
6901
7900
BC857BW
3985
100K
3986
220R
3987
220R
3988
47R
7901
BC847BW
3989
1K
2931
47u
RES
3983
1K
4900
3990
100K
7902
TCDT1102G
6954
1N4148
7903
TCET1101G
3991
1K
4904
2932
22n
AC MAINS
INPUT
220V
0201
* 1951
SDDF
T4.0AE
0202
TO 0010
OF A1
3966
3M3
3957
3M3
CL 26532071_001.eps
250602

| | |
|---|---|
| 0201 | D2 |
| 0202 | D7 |
| 0203 | A5 |
| 1910 | A2 |
| 1951 | D3 |
| 2930 | A1 |
| 2931 | C4 |
| 2932 | D5 |
| 3957 | E3 |
| 3966 | E3 |
| 3978 | A3 |
| 3981 | B3 |
| 3982 | A2 |
| 3983 | C3 |
| 3984 | A1 |
| 3985 | B5 |
| 3986 | B5 |
| 3987 | B6 |
| 3988 | B4 |
| 3989 | B4 |
| 3990 | C3 |
| 3991 | C5 |
| 4900 | C3 |
| 4901 | B3 |
| 4903 | B3 |
| 4904 | D6 |
| 6901 | B3 |
| 6953 | A1 |
| 6954 | C6 |
| 7900 | B4 |
| 7901 | B3 |
| 7902 | C5 |
| 7903 | C6 |
| F903 | D3 |
| F904 | D6 |
| F905 | D3 |
| F906 | D6 |
| F907 | A5 |
| F908 | A5 |
| F909 | A5 |
| F910 | C2 |
| I901 | A1 |
| I902 | B3 |
| I903 | A2 |
| I904 | B2 |
| I905 | E3 |
| I906 | B5 |
| I907 | B4 |
| I908 | B5 |
| I909 | C6 |
| I910 | C4 |
| I911 | C4 |
| I912 | C6 |
| I913 | A5 |
| I914 | D5 |
| I915 | E3 |

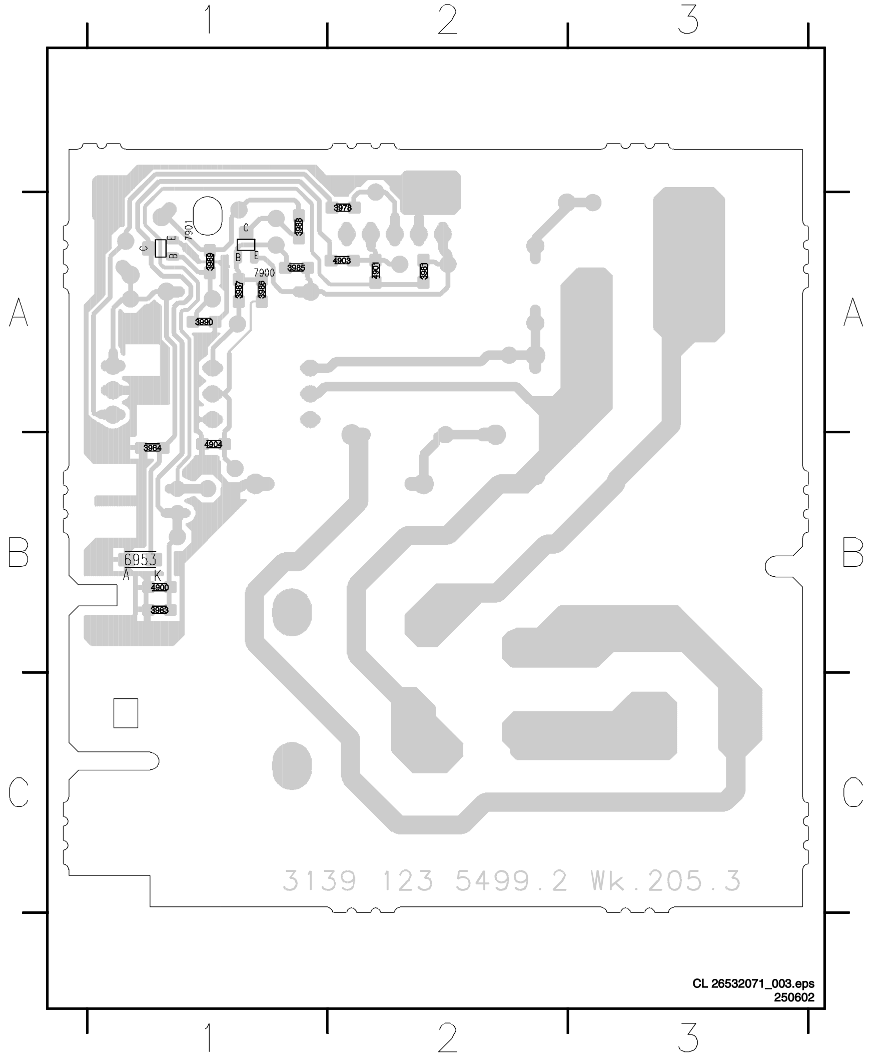
## Layout Mains Switch Panel (Top Side)

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0201 | B1 | 0203 | A2 | 1951 | C2 | 2931 | A3 | 3957 | B2 | 3982 | A3 | 6901 | B3 | 7902 | A3 |
| 0202 | A1 | 1910 | A3 | 2930 | A3 | 2932 | A1 | 3966 | B2 | 3991 | A2 | 6954 | A2 | 7903 | A3 |


1
2
3
A
B
C
2932
0202
0203
2931
3991
3982
2930
1910
7903
7902
6954
3966
3957
6901
0201
1951
3139 123 5499.2 Wk.205.3
CL 26532071_002.eps
250602

## Layout Mains Switch Panel (Bottom Side)

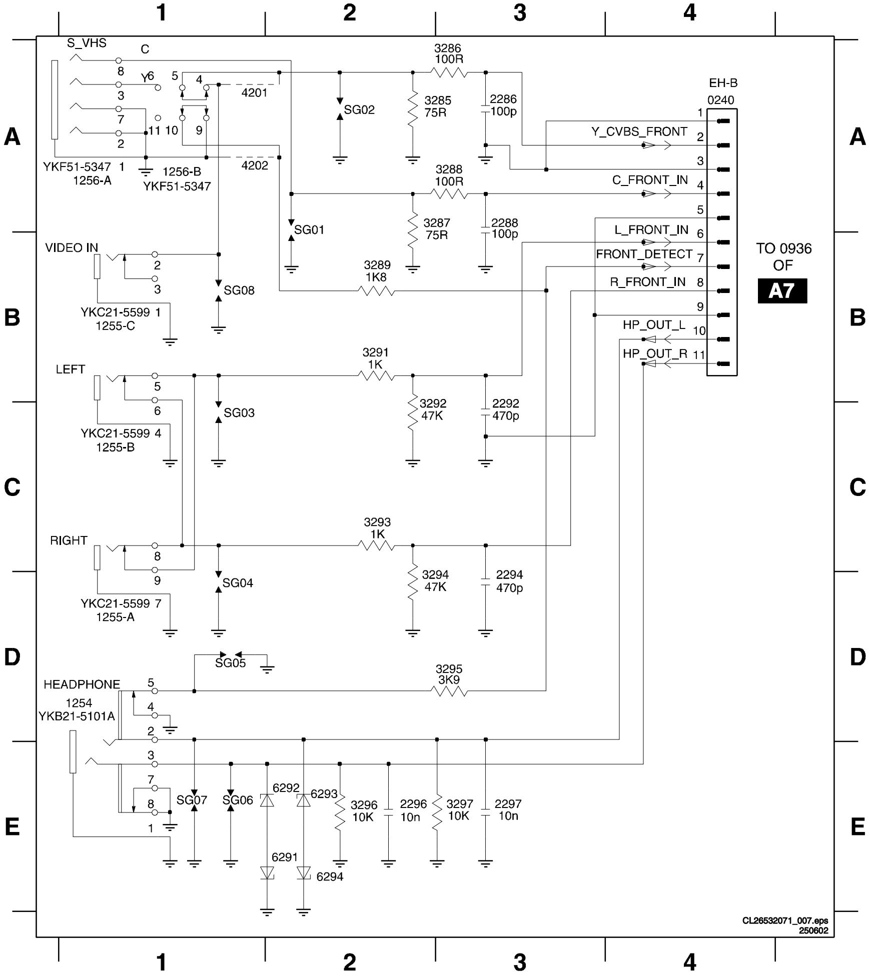
| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3978 | A2 | 3984 | B1 | 3987 | A1 | 3990 | A1 | 4903 | A2 | 7900 | A1 |
| 3981 | A2 | 3985 | A1 | 3988 | A1 | 4900 | B1 | 4904 | B1 | 7901 | A1 |
| 3983 | B1 | 3986 | A1 | 3989 | A1 | 4901 | A2 | 6953 | B1 | | |


1
2
3
A
B
C
7901
7900
3978
4903
3985
3990
3984
4904
6953
A
K
4900
3983
3139 123 5499.2 Wk.205.3
CL 26532071_003.eps
250602

## Side I/O Panel

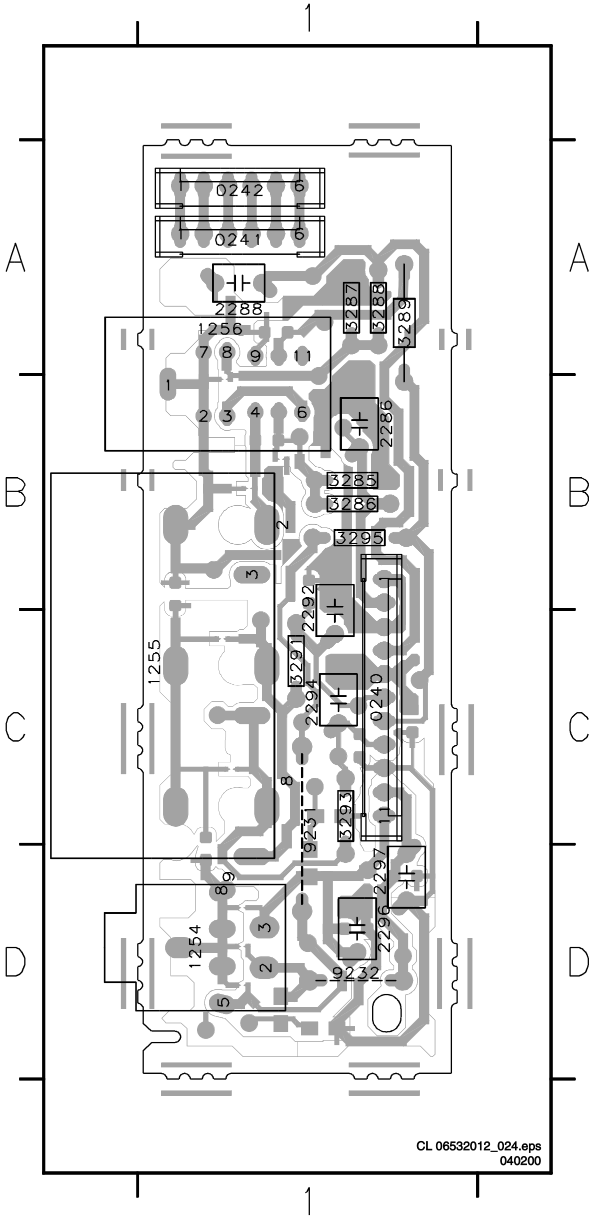
# L SIDE IO PANEL

| | |
|---|---|
| 0240 | A4 |
| 1254 | D1 |
| 1255-A | D1 |
| 1255-B | C1 |
| 1255-C | B1 |
| 1256-A | A1 |
| 1256-B | A1 |
| 2286 | A3 |
| 2288 | A3 |
| 2292 | B3 |
| 2294 | C3 |
| 2296 | E2 |
| 2297 | E3 |
| 3285 | A3 |
| 3286 | A3 |
| 3287 | A3 |
| 3288 | A3 |
| 3289 | B2 |
| 3291 | B2 |
| 3292 | B2 |
| 3293 | C2 |
| 3294 | C3 |
| 3295 | D3 |
| 3296 | E2 |
| 3297 | E3 |
| 4201 | A1 |
| 4202 | A1 |
| 6291 | E2 |
| 6292 | E2 |
| 6293 | E2 |
| 6294 | E2 |
| SG01 | B2 |
| SG02 | A2 |
| SG03 | C1 |
| SG04 | D1 |
| SG05 | D1 |
| SG06 | E1 |
| SG07 | E1 |
| SG08 | B1 |


1
2
3
4
A
B
C
D
E
S_VHS
C
Y
YKF51-5347 1
1256-A
1256-B
YKF51-5347
4201
4202
SG02
3286
100R
3285
75R
2286
100p
3288
100R
3287
75R
2288
100p
SG01
3289
1K8
EH-B
0240
Y_CVBS_FRONT
C_FRONT_IN
L_FRONT_IN
FRONT_DETECT
R_FRONT_IN
HP_OUT_L
HP_OUT_R
TO 0936
OF
A7
VIDEO IN
YKC21-5599 1
1255-C
SG08
LEFT
YKC21-5599 4
1255-B
SG03
3291
1K
3292
47K
2292
470p
RIGHT
YKC21-5599 7
1255-A
SG04
3293
1K
3294
47K
2294
470p
SG05
HEADPHONE
1254
YKB21-5101A
3295
3K9
SG07
SG06
6292
6293
6291
6294
3296
10K
2296
10n
3297
10K
2297
10n
CL26532071_007.eps
250602

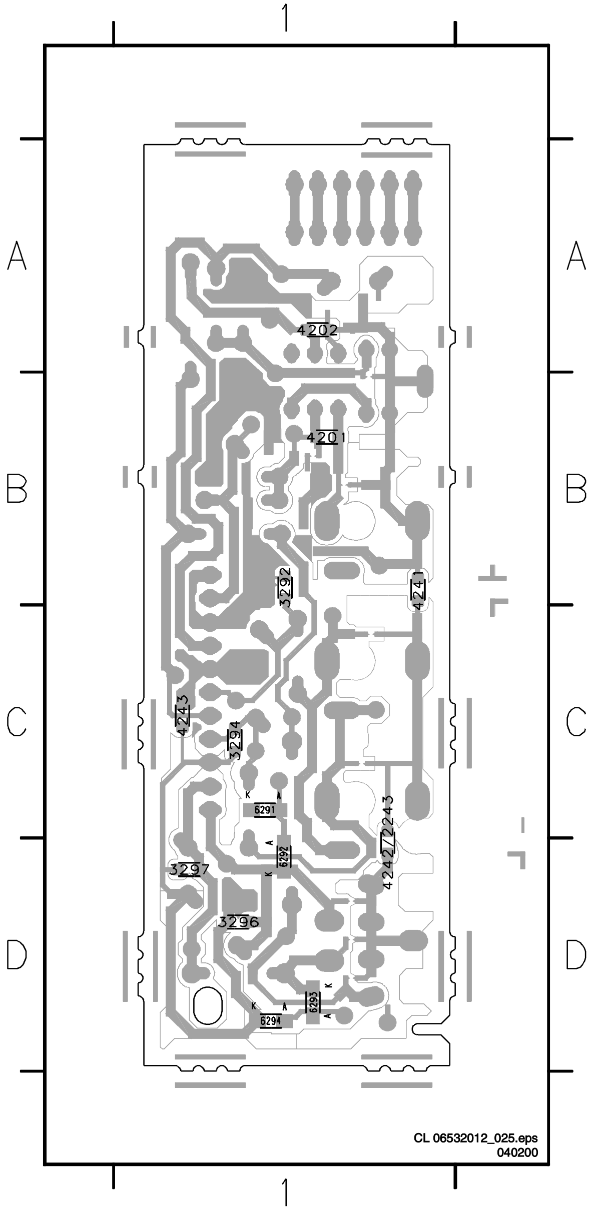
## *Personal Notes:*

## Layout Side I/O Panel (Top Side)


1
A
B
C
D
0242
0241
2288
1256
3287
3288
3289
2286
3285
3286
3295
2292
3291
2294
0240
1255
9231
3293
2297
2296
1254
9232
CL 06532012_024.eps
040200

| | |
|---|---|
| 0240 | C1 |
| 0241 | A1 |
| 0242 | A1 |
| 1254 | D1 |
| 1255 | C1 |
| 1256 | A1 |
| 2286 | B1 |
| 2288 | A1 |
| 2292 | B1 |
| 2294 | C1 |
| 2296 | D1 |
| 2297 | D1 |
| 3285 | B1 |
| 3286 | B1 |
| 3287 | A1 |
| 3288 | A1 |
| 3289 | A1 |
| 3291 | C1 |
| 3293 | C1 |
| 3295 | B1 |
| 9231 | C1 |
| 9232 | D1 |

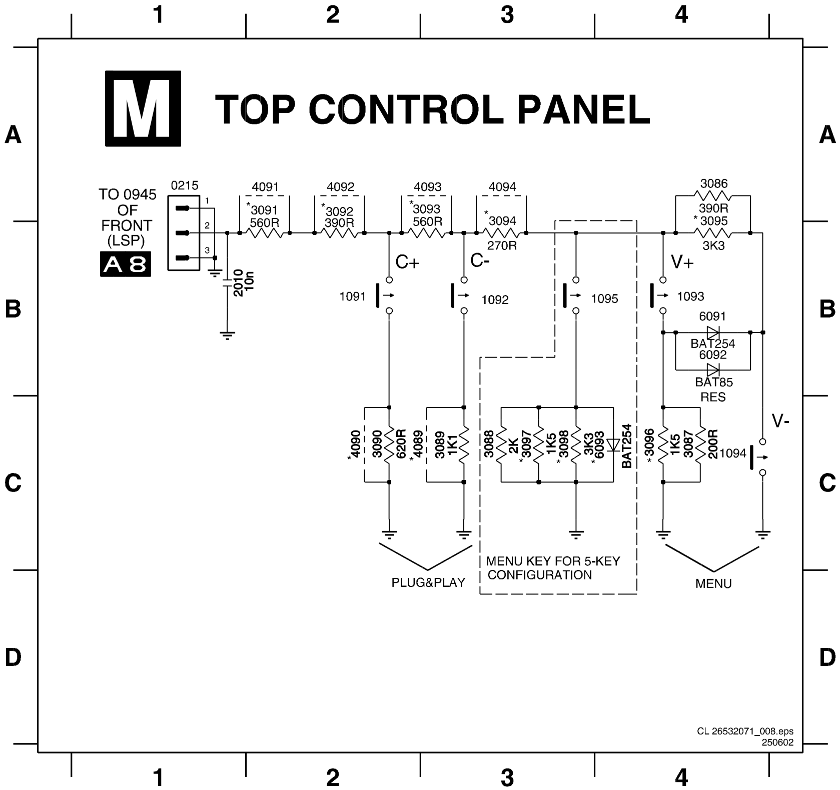
## Layout Side I/O Panel (Bottom Side)


1
A
B
C
D
4202
4201
3292
4241
4243
3294
6291
6292
4242/2243
3297
3296
6293
6294
CL 06532012_025.eps
040200

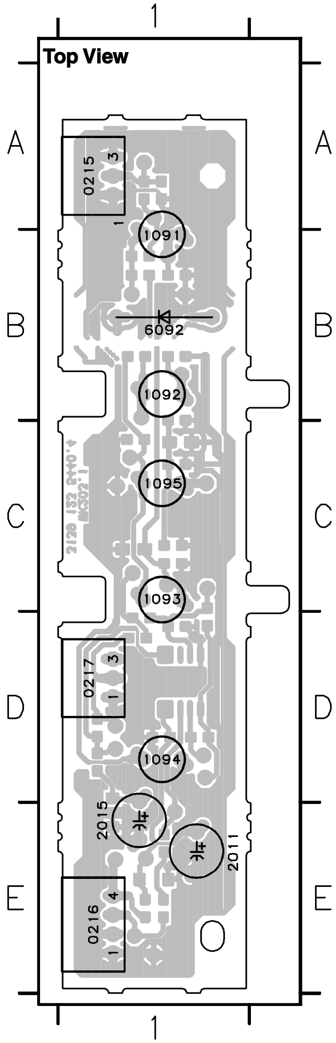
| | |
|---|---|
| 3292 | B1 |
| 3294 | C1 |
| 3296 | D1 |
| 3297 | D1 |
| 4201 | B1 |
| 4202 | A1 |
| 4241 | B1 |
| 4242/2243 | D1 |
| 4243 | C1 |
| 6291 | C1 |
| 6292 | D1 |
| 6293 | D1 |
| 6294 | D1 |

## Top Control Panel

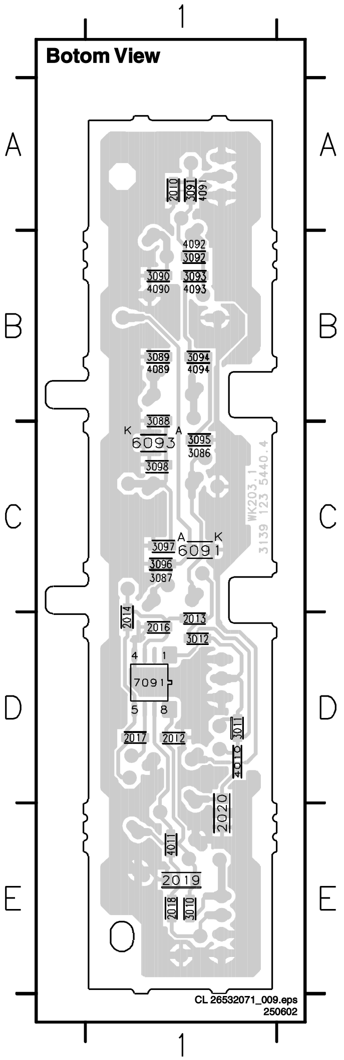
| | |
|---|---|
| 0215 | A1 |
| 1091 | B2 |
| 1092 | B3 |
| 1093 | B4 |
| 1094 | C4 |
| 1095 | B4 |
| 2010 | B1 |
| 3086 | A4 |
| 3087 | C4 |
| 3088 | C3 |
| 3089 | C3 |
| 3090 | C2 |
| 3091 | A2 |
| 3092 | A2 |
| 3093 | A3 |
| 3094 | B3 |
| 3095 | B4 |
| 3096 | C4 |
| 3097 | C3 |
| 3098 | C3 |
| 4089 | C3 |
| 4090 | C2 |
| 4091 | A2 |
| 4092 | A2 |
| 4093 | A3 |
| 4094 | A3 |
| 6091 | B4 |
| 6092 | B4 |
| 6093 | C4 |


1
2
3
4
A
B
C
D
M
TOP CONTROL PANEL
TO 0945 OF FRONT (LSP)
A8
0215
1
2
3
2010
10n
4091
*3091
560R
4092
*3092
390R
4093
*3093
560R
4094
*3094
270R
3086
390R
*3095
3K3
C+
C-
V+
V-
1091
1092
1095
1093
1094
6091
BAT254
6092
BAT85
RES
*4090
3090
620R
*4089
3089
1K1
3088
2K
*3097
1K5
*3098
3K3
*6093
BAT254
*3096
1K5
3087
200R
PLUG&PLAY
MENU KEY FOR 5-KEY CONFIGURATION
MENU
CL 26532071_008.eps
250602

## Layout Top Control Panel


1
Top View
A
B
C
D
E
0215
1091
6092
1092
1095
1093
0217
1094
2015
2011
0216

| | |
|---|---|
| 0215 | A1 |
| 0216 | E1 |
| 0217 | D1 |
| 1091 | B1 |
| 1092 | B1 |
| 1093 | C1 |
| 1094 | D1 |
| 1095 | C1 |
| 2011 | E1 |
| 2015 | E1 |
| 6092 | B1 |


1
Botom View
A
B
C
D
E
2010
3091
4091
4092
3092
3090
4090
3093
4093
3089
4089
3094
4094
3088
6093
K
A
3095
3086
3098
3097
3096
3087
6091
2014
2016
2013
3012
7091
4
1
5
8
2017
2012
3011
4010
2020
4011
2019
2018
3010
CL 26532071_009.eps
250602

| | |
|---|---|
| 2010 | A1 |
| 2012 | D1 |
| 2013 | D1 |
| 2014 | D1 |
| 2016 | D1 |
| 2017 | D1 |
| 2018 | E1 |
| 2019 | E1 |
| 2020 | E1 |
| 3010 | E1 |
| 3011 | D1 |
| 3012 | D1 |
| 3086 | C1 |
| 3087 | C1 |
| 3088 | B1 |
| 3089 | B1 |
| 3090 | B1 |
| 3091 | A1 |
| 3092 | B1 |
| 3093 | B1 |
| 3094 | B1 |
| 3095 | C1 |
| 3096 | C1 |
| 3097 | C1 |
| 3098 | C1 |
| 4010 | D1 |
| 4011 | E1 |
| 4089 | B1 |
| 4090 | B1 |
| 4091 | A1 |
| 4092 | B1 |
| 4093 | B1 |
| 4094 | B1 |
| 6091 | C1 |
| 6093 | C1 |
| 7091 | D1 |